ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

25c a Copy

OCT. 1938

McGraw-Hill Co. of Calif.

Using Direct Mail Advertising To Tell the Electrical Story

Wherever electricity is used or can be used, Edison literature is doing a consistent selling job. It prepares the way for aggressive personal selling—makes it easier for the salesman to tell his story—conserves his time by eliminating wasted calls. It is one more link in the promotion chain which assists in the rapid electrification of millions of Southern Calfornia homes.

SOUTHERN CALIFORNIA Edison

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The All-Industry Magazine of Progress

ELECTRICAL WEST

MEMBER AUDIT BUREAU OF CIRCULATIONS

ESTABLISHED 1887 AND INCORPORATING THE "ELECTRICAL JOURNAL," "JOURNAL OF ELECTRICITY, POWER & GAS" AND "JOURNAL OF ELECTRICITY"

ABP

McGRAW-HILL COMPANY OF CALIFORNIA
883 Mission Street, San Francisco

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Keeping Up-to-Date

HOW much would you, an electrical man, be willing to pay for a service which fine-combed the electrical industry for news, names, ideas, methods employed, results obtained and selected for you those things that are pertinent, significant, valuable?

Some business men both within and without the electrical industry are willing to pay a great deal. Each month hundreds of them pay thousands of dollars to a Washington or financial-service agency which digests the news of past, present and future events in the light of their importance to business.

Undoubtedly this is worthwhile help. But it is costly. Hence rises a question: How is the electrical man of moderate means to keep up-to-date?

In the eleven Western states, this is no great problem.

At a cost to you of $2 a year ELECTRICAL WEST editors comb the news, select the news, high-light the news which will help to make you more successful. Trained observers experienced in the needs of every phase of the industry, these editors boil down every scrap of vital information into quick-reading, easily digested form.

Oftentimes this means that the report of your favorite activity seems short. But remember: We of ELECTRICAL WEST must save everyone time. We must discard the unimportant in favor of the important. We must do the same for every other electrical activity in the West.

This is no easy job. But it keeps us alive, on our toes. We hope it keeps you alive, up-to-date also.

Take this way to

INCREASED REVENUE

Get the Story on Why Engineers Throughout the Country Specify Allis-Chalmers Equipment... Find Out How You Can Cut Your Operating Costs... Increase Your Revenue... Get More for Every Dollar You Spend... with the Equipment that Pays for Itself!

How can you increase revenue on your lines . . . make your equipment pay you larger dividends . . . get more earnings? The shortest way . . . the way engineers all over the country have found the sure way . . . is to specify Allis-Chalmers electrical equipment.

Allis-Chalmers equipment is engineered to cut your costs . . . to pay you more for every dollar you invest . . . to furnish trouble-free, dependable operation at a lower over-all cost!

The most efficient steam turbines in history . . . power transformers that give you extra, money-saving features at no extra cost . . . distribution transformers that incorporate features evolved by Allis-Chalmers to give you maximum reliability and performance at the same cost as ordinary ones . . . metal-clad switchgear, pioneered by Allis-Chalmers in 1924, built for fool-proof, safe, and low-cost operation . . . all these combine to cut your operating cost to a minimum . . . raise your revenue to a maximum!

No wonder Allis-Chalmers is frequently called upon to solve difficult problems in power apparatus manufacture and application. Engineering background, research, service . . . get you the right equipment to do the job you want done. Call the Allis-Chalmers District Office nearest you. Get the details. Find out how you can cut costs and increase revenue on your system . . . when you put 90 years of engineering experience to work for you! 967

THERE IS AN ALLIS-CHALMERS DISTRICT OFFICE CLOSE TO YOU AND READY TO GIVE YOU PROMPT AND COMPLETE COOPERATION

SALT LAKE CITY, UTAH, KEARNS BUILDING
LOS ANGELES, CAL., ROWAN BUILDING
PORTLAND, OREGON, 1311 S. E. UNION AVE.
PHOENIX, ARIZONA, LUHRS TOWER
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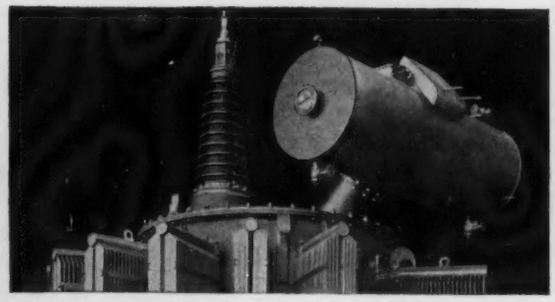
DENVER, COLORADO, CONTINENTAL OIL BUILDING

ALLIS-CHALMERS
MILWAUKEE, WISCONSIN

POWER TRANSFORMERS WITH EXTRA, MONEY-SAVING FEATURES AT NO EXTRA COST



- The No-Load Tap Changer reduces operating costs, contributes to more efficient, safer transformer operation.
- The Uni-Directional Breather reduces the number of times oil filtering is necessary.
- The Oil-Sealed System eliminates the need of periodic adjustment or replacement of mechanically operated devices. No continuous gas supply is required. Oil is kept free of sludge and moisture.

All of these features, plus others, are obtainable at no extra cost. These transformers are built in the largest commercial sizes. They meet all kinds of special conditions of operation most economically, considering installation, performance, and maintenance. Bulletin 1182 gives you complete details.

INCREASE YOUR REVENUE WITH ALLIS-CHALMERS 5/8% HALF-CYCLING STEP REGULATORS

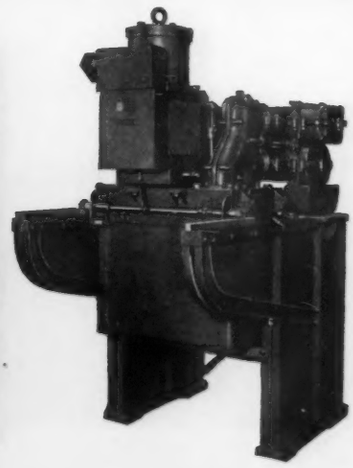
Smooth regulation of primary feeders pays a good return on your voltage regulator investment in terms of increased load and customer satisfaction. The smaller the size of step, the closer the voltage can be regulated . . . the smaller the voltage and kva to be handled by the tap-changing mechanism. You get better contact performance . . . smoother operation . . . less maintenance trouble and expense. For these advantages, informed engineers favor 5/8% Half-Cycling Step Regulators over other types. Send for Engineering Bulletin 1170-B.

ALLIS-CHALMERS DISTRIBUTION TRANSFORMERS ARE READILY ADAPTABLE TO CHANGING SERVICE OR LOAD CONDITIONS

Your transformer dollars go farther when you install Allis-Chalmers distribution transformers. These well-designed, service-proved transformers fit into your operating practice . . . are readily adaptable to changing service or load conditions. You get surge-protected design. You get solderless connectors and stud bushings. You get bushing coordination. Improve your service and lower your maintenance costs with Allis-Chalmers distribution transformers. Write for Bulletin 1173.

SAVE ON BUILDING COSTS...USE ALLIS-CHALMERS METAL-CLAD SWITCHGEAR FOR YOUR OIL CIRCUIT BREAKER INSTALLATIONS

You can save money by reducing structural costs when you install Allis-Chalmers Metal-Clad Switchgear. Shipped completely assembled, ready for installation. No specially prepared building is necessary. And you get interrupting capacity with the highest possible degree of safety . . . low cost . . . easy maintenance and inspection . . . dependable performance under all service conditions. No human error is possible in the sequence of switching operations. Write for Engineering Bulletin 1145-B.



C·S·P

Means no more Burnouts from Overloads

The CSP Transformer permits accurate application of ratings to loads.

If the load increases, the signal light on the transformer automatically gives a warning that it is necessary to install a larger transformer. Thus, there is no need to use a larger transformer than necessary for the initial load.

Automatic load checking and protection from burnouts due to overloads are only two of the reasons why the CSP gives you the lowest operating cost. Ask the Westinghouse representative for complete information or write for booklet 2042-A, Westinghouse Electric & Manufacturing Company, Department 7-N, East Pittsburgh, Pennsylvania.

ONLY C·S·P TRANSFORMERS ARE:

1. Completely Self Protected against lightning — no fuses to replace.
2. Completely Self Protected against burnouts from short circuits.
3. Completely Self Protected against burnouts from overloads.

PLUS

4. Simple, low-cost installation; maintenance expense low after installation.

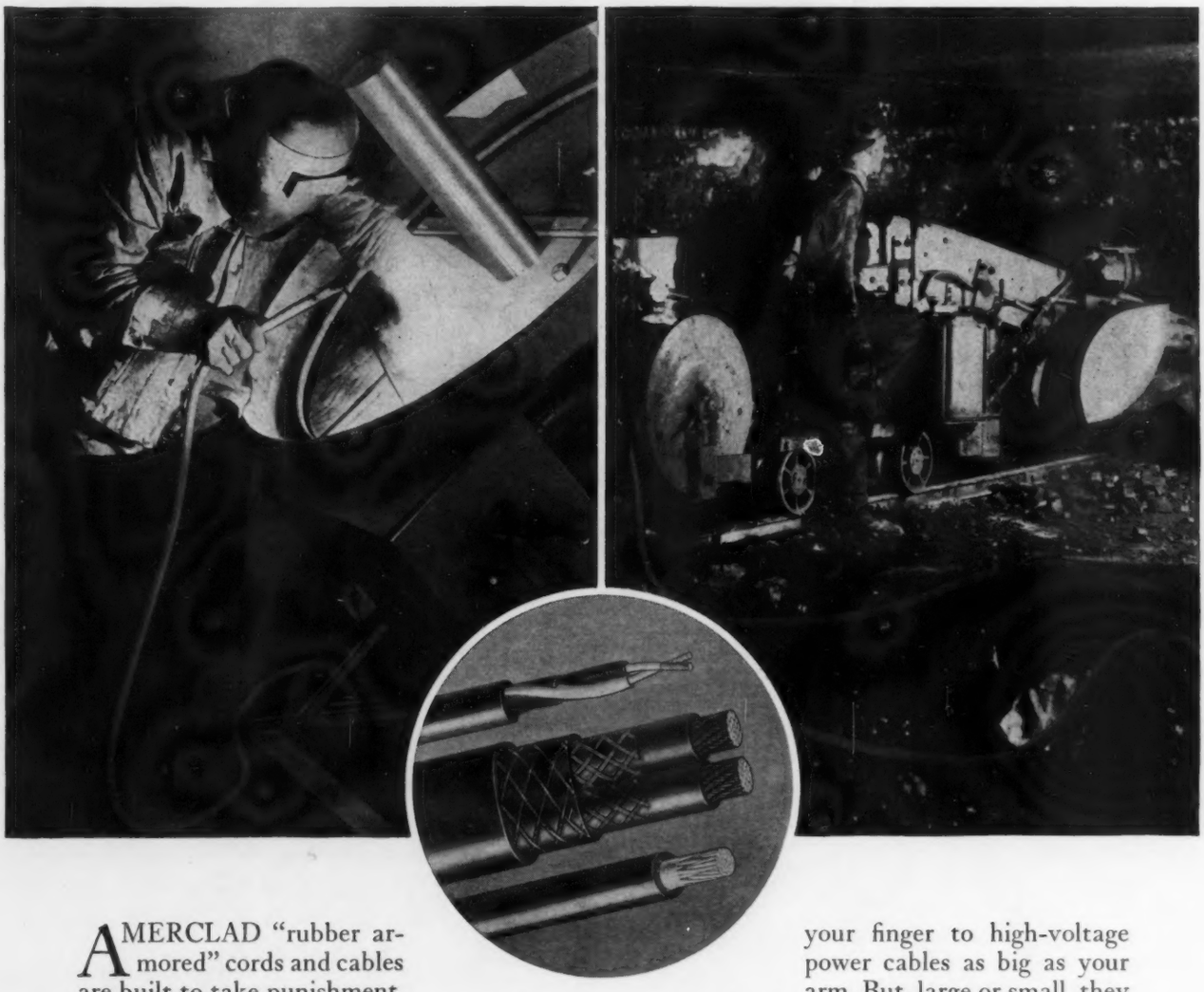
I-70124

W WESTINGHOUSE ELECTRIC

Westinghouse

Completely SELF PROTECTING TRANSFORMERS

For Hard Usage . . . your Best Bet is Amerclad



AMERCLAD "rubber armored" cords and cables are built to take punishment. Wherever portable conductors get rough usage—in mines, factories, garages or machine shops; in contact with oil, mud or acid waters —you are likely to find Amerclad on the job.

There are many sizes and types of Amerclad designed for many purposes — from slender cords that can be wrapped around your finger to high-voltage power cables as big as your arm. But, large or small, they are all Amerclad and all have the same protective jacket of tough "tire-tread" rubber.

We will be glad to send you free of charge our Amerclad catalog. It is profusely illustrated and describes a great variety of flexible, hard-wearing Amerclad All-Rubber Cords and Cables. Why not write us today.

COLUMBIA STEEL COMPANY • ***San Francisco***

Pacific Coast Distributors **of Amerclad All-Rubber Cords and Cables for American Steel & Wire Company**

United States Steel Products Company, New York, ***Export Distributors***

UNITED STATES STEEL

This Fall—and Next Year, Too—

You Can Buy **MORE STATION REGULATION**

for the Same Money

•

GENERAL ELECTRIC

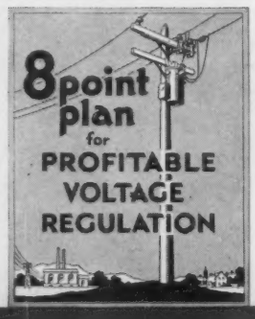
Has Found a Practical Way to Build a Regulator for Use Indoors and Outdoors

at a Lower Price

YOU may be able to afford another regulator in this year's budget—certainly in next year's—because of the savings possible with this new flexible G-E station-type induction regulator for indoor and outdoor service.

Every prior attempt to consolidate indoor and outdoor designs left something to be desired. Now, it is a pleasure to announce a new induction regulator, factory-assembled, and all ready for installation, with no extras, in either an indoor or an outdoor location.

As a result of the application of sound engineering we can now offer you a product that is practical, simple, and reliable—and at prices substantially lower than those of the previous outdoor designs. We know it is a good regulator, and we believe that your appraisal, through use, will prove it to *your* satisfaction. Complete information, including prices, is ready for you in a new bulletin, GEA-2985, a copy of which you can obtain by sending the coupon to General Electric Co., Schenectady, N. Y.



GENERAL ELECTRIC

A NEW FEEDER-VOLTAGE REGULATOR with GREATER SIMPLICITY-ECONOMY-RELIABILITY

The new G-E station-type induction regulator for both indoor and outdoor service, available in ratings of 36, 48, 60, and 72 kva, single-phase, 60 cycles, 2400 volts and 4800 volts

PRACTICAL? Yes; the control parts are all readily accessible; the position indicator is visible at a glance; and the driving mechanism, the potential supply, and the current transformer are all under oil, inside the main tank. No lubrication is needed—and no mechanical brakes, because the motor is braked dynamically.

SIMPLE? Yes; the only external connections are those to the main line. Control connections between regulators in a three-phase bank are eliminated—when banking, it's only necessary to shift a plug from one receptacle to another in the line-drop compensator.

ECONOMICAL? Yes; as one example of the lower prices, the price of the popular 48-kva, 2400-volt rating is 11½ per cent less than that of the previous outdoor model.

RELIABLE? Yes; detailed improvements, with General Electric's background of more than 40 years in supplying feeder-voltage regulators, make this new regulator one that will pay you to use, in terms of reliable service as well as in dollars saved in first cost and operating cost.

MAIL COUPON NOW

General Electric Co., Dept. 6 C 201
Schenectady, N. Y.

Please send me a copy of your new Bulletin GEA-2985, covering the new station-type induction regulator.

Name .....

Company .....

Address .....

City ..... *State* 350-143

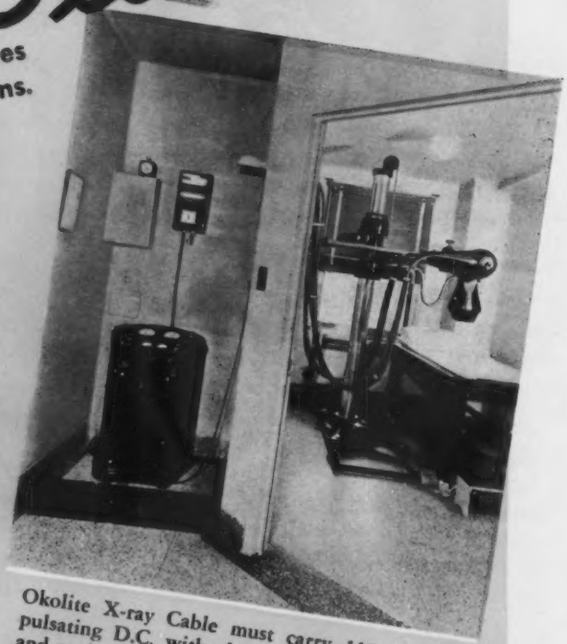
Air Transport completes journey of Okoprene dredge cable to heart of New Guinea where gold mining operations are carried on under rapid alternations of tropical sun and storms. Maintenance must be at a minimum, failure can not be tolerated.

Underground cable meets submarine requirements. Okonite Insulated Fire Alarm Cables, sections of which are more than 35 years old, functioned perfectly under flood conditions in Springfield, Mass.

Installations Illustrated

A pictorial record of the successful use of Okonite wires and cables under extraordinary and unforeseen conditions.

However romantic submarine cables may be, they offer real problems. Here is one of two Okonite submarine cables being laid 125 fathoms deep (750 feet to a land-lubber) in Puget Sound. These rubber power cables, the deepest ever laid, carry 13,200 volts over their 4½-mile lengths.



Okolite X-ray Cable must carry 110,000 volts pulsating D.C. with absolute safety to operator and patient. It is used by the great majority of manufacturers of X-ray apparatus—thereby making a major contribution to the welfare of mankind.

You, too, may have a wire or cable problem that is tough to lick. If so, write us and let our engineers consult with you regarding it.

1938 Marks Our 60th Year of Service

THE OKONITE COMPANY

Founded 1878

EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

HAZARD INSULATED WIRE WORKS DIVISION

New York Boston Seattle Buffalo
Philadelphia Los Angeles Pittsburgh

THE OKONITE CALLENDER CABLE CO., INC.

Chicago Dallas Detroit Atlanta
St. Louis Washington San Francisco

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

THEY'VE DISCOVERED CHROMALOX

THE *Super-Speed* RANGE UNIT THAT GIVES ALL THE ADVANTAGES OF MODERN ELECTRIC COOKING!

Dealers driving ahead with the Modern Kitchen Bureau's big "Discovery Campaign", will find the trail to more sales already broken by the thousands of range prospects who through various sources, have become informed that *cooking with an electric range* is a revelation in COMFORT, SPEED, CLEANLINESS and CONVENIENCE.

This is definitely the case when a Chromalox-equipped Electric range goes into a home, and a new circle of housewives is inspired with the glowing enthusiasm of the new owner. New range prospects are made, needing only the impact of a sales drive like the "Discovery Campaign" to turn them into buyers.

Get back of the "Discovery Campaign", by first discovering for yourself every striking feature of Chromalox units, from *your* standpoint as well as from that of your prospect. Find out *why* they last so long and *why* their owners enthusiastically recommend them to friends.

Write us or our nearest representative

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash. • 1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Cal. • 912 E. Third St., Los Angeles, Cal.
THE PETERSON COMPANY • 1921 Blake Street, Denver, Colo.

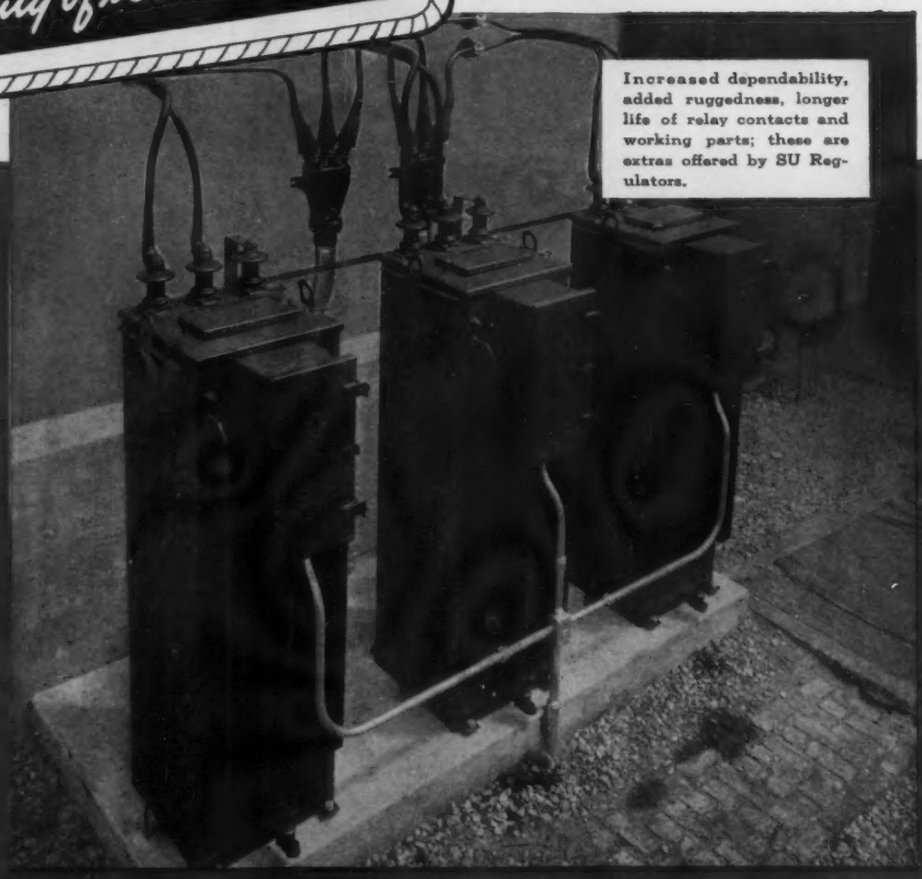
Sell Chromalox-equipped ranges—and *discover* to your profit their many outstanding advantages.

EDWIN L. WIEGAND CO., 7540 Thomas Blvd., Pittsburgh, Pa.

First cost.....Less
Installation cost..Less
Maintenance....Less
Inspection.....Less
Life.....Plus
Quality of service.Plus

New!

THE WESTINGHOUSE Type SU



Increased dependability, added ruggedness, longer life of relay contacts and working parts; these are extras offered by SU Regulators.

THE PROBLEM: Produce a voltage regulator to provide smooth voltage regulation at a cost permitting its use on lower income feeders. Performance must equal that of the older Westinghouse induction regulators.

THE ANSWER: The new Westinghouse Type SU Induction Feeder Voltage Regulator.

W WESTINGHOUSE ELECTRIC

Westinghouse

Induction Voltage Regulator

STURDY CONSTRUCTION, POSITIVE-ACTION CONTROL, AND SIMPLIFIED OPERATING MECHANISM MAKE FEEDER VOLTAGE REGULATION *Lower in Cost*

One design for all classes of service, made standardization possible. Simplification of control and operating parts and an increased use of welding in fabricating this regulator, permitted other savings. Though high standards were maintained, a lower first cost was obtained.

The operating mechanism is completely oil-immersed, the control panel enclosed in a weatherproof cabinet, protecting the working parts against moisture and dust. A positive-acting voltage regulator relay, in combination with dynamic braking for the motor, makes every move of the operating mechanism count. Contacts are longer lived and there are fewer working parts to require attention. A minimum of maintenance is certain.

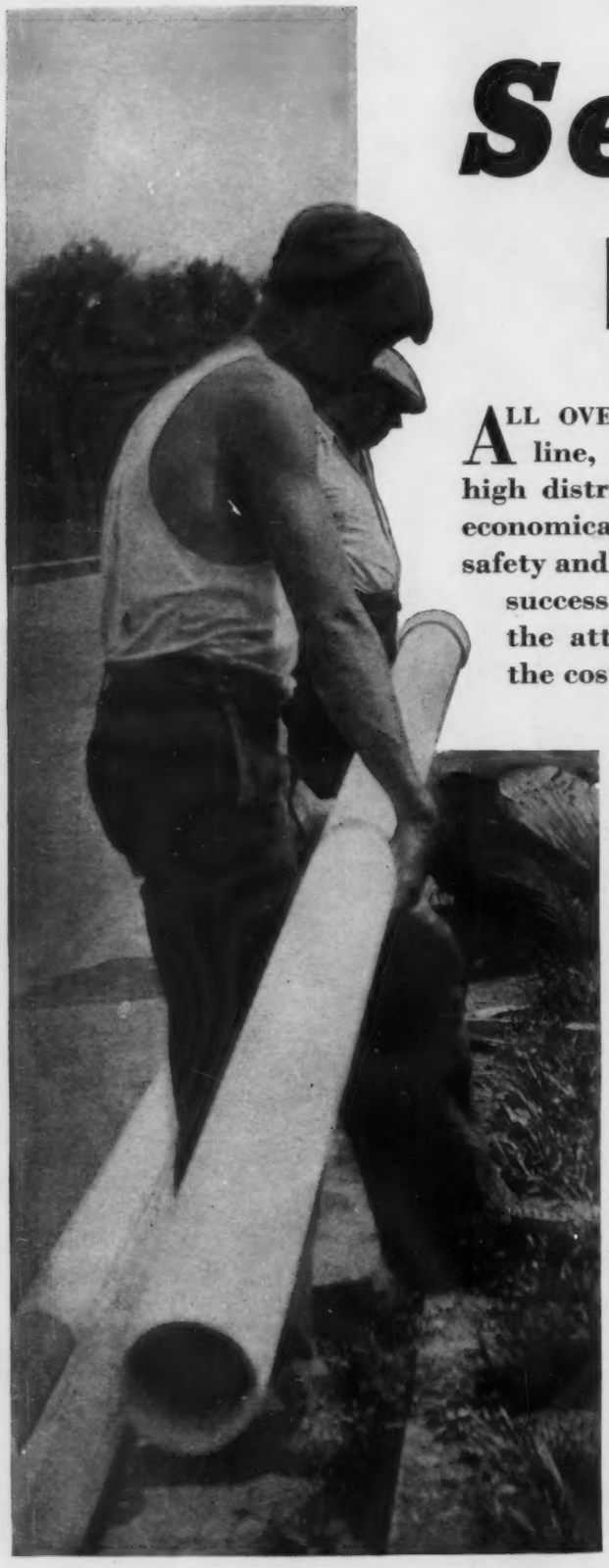
Type SU Regulators for emergency or lifetime jobs

Though designed for many years of service on any job, Type SU Regulators can be moved from one location to another to meet emergencies, requiring no special care in handling, no special mountings. Spot them anywhere, connect the three main leads to the line in trouble, and they're ready to go to work.

Type SU Induction Feeder Voltage Regulators are used for correcting voltages on single phase feeders or in banks of polyphase feeders; 2400 and 4160 volts, 150 to 500 amperes, and 4800 volts, 75 to 250 amperes. They are described in detail in the booklet, B-2165. For a copy, write to Westinghouse Electric & Manufacturing Company, Room 7-N, East Pittsburgh, Penna.

Type SU

INDUCTION FEEDER VOLTAGE REGULATORS



Setting a FOR LOW-COST

ALL OVER THE COUNTRY, in every type of power line, J-M Transite Conduit and Korduct fight high distribution costs . . . bring the advantages of economical installation, increased durability, greater safety and lower maintenance. The reasons behind the success of these asbestos-cement ducts well deserve the attention of everyone interested in reducing the cost of electrical distribution.

ECONOMICAL HANDLING

Both Transite Conduit and its thinner walled companion product, Transite Korduct, can be handled easily and economically. They are furnished in long lengths and, being made of asbestos and cement, are comparatively light in weight. Because they are entirely mineral in composition, they can be stored outdoors indefinitely with no harmful deterioration.

LOWER INSTALLATION COSTS

Transite Conduit can be laid underground without a concrete envelope, thus eliminating the entire expense of "concreting-in." Transite Korduct, thinner walled and lower priced, saves on material costs when concreting is specified. Because of their long, light lengths, they are rapidly assembled by installation crews on any type of construction.

EVERY TYPE of duct distribution system, above ground or below, exposed or enclosed, can be economically constructed and maintained when J-M Transite Ducts are used.

JOHNS-MANVILLE PRODUCTS

JOHNS-MANVILLE

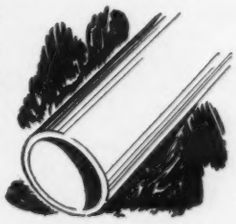
New Standard ELECTRICAL DISTRIBUTION

UNUSUALLY SMOOTH BORE

The polished steel mandrel on which Transite Ducts are made imparts an unusually smooth interior surface that *stays* smooth in service. Joints are tight and snug . . . free from jagged obstructions. Therefore, cable pulling is easier . . . long pulls may be made without injuring the sheath . . . cables can be readily replaced at any time.

HIGHLY CORROSION-RESISTANT

Transite Conduit and Transite Korduct are virtually unaffected by all forms of corrosion. Made of two of the most durable materials known . . . asbestos and cement, these ducts are non-metallic and inorganic . . . will not rust or decay under any conditions. Furthermore, Transite Ducts are completely immune to electrolysis.



INCOMBUSTIBLE

Transite Conduit and Korduct, because of their asbestos-cement composition, are absolutely incombustible. They have unusually high resistance to heat, flame and arc, and will not contribute to the generation of fumes or combustible gases when burnouts occur in the line.

HIGHLY WEATHER-RESISTANT

Prolonged exposure to weather has little, if any, effect on Transite Ducts. In fact, this same asbestos-cement material, in sheet form, has set an enviable record for permanence in use as an industrial roofing and siding material. Transite Conduit, when used in exposed locations, stands up year after year with virtually complete freedom from maintenance.

STRONG AND DURABLE

Transite Ducts are unusually strong, and even more important, they retain their full strength and true form under sustained loads. Remarkably durable, Transite Conduit and Korduct form a distribution system that offers the best assurance of low maintenance costs through the years.

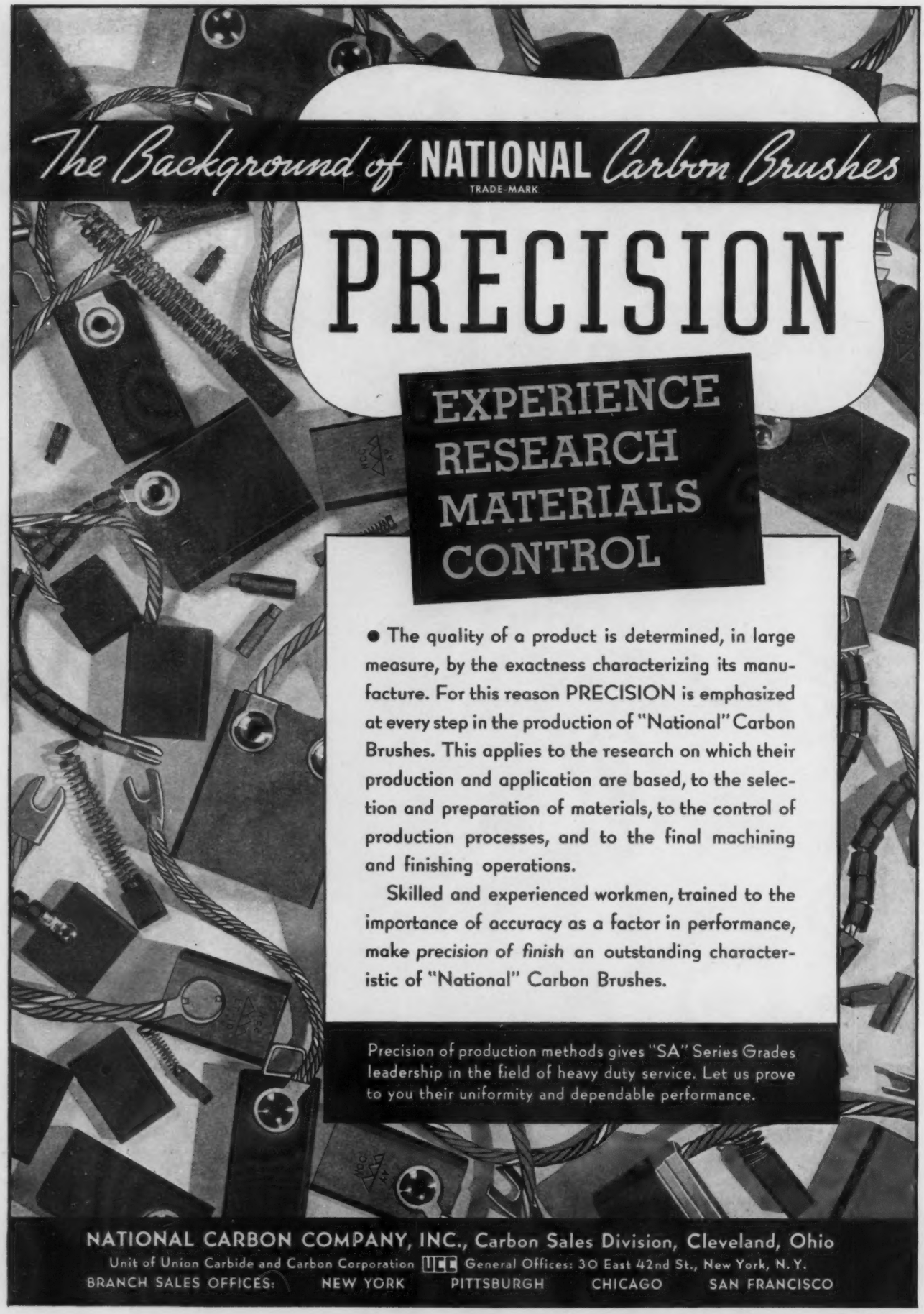
WRITE FOR COMPLETE DETAILS

With these brief facts, it is easy to understand why Transite Ducts have been chosen for important distribution systems everywhere. You should have complete information. Write for Data-Sheet Manual DS-410. Address Johns-Manville at Los Angeles, San Francisco, or Seattle.

TRANSITE CONDUIT • TRANSITE KORDUCT

FOR USE UNDERGROUND WITHOUT CONCRETE, AND FOR EXPOSED LOCATIONS

FOR INSTALLATION IN CONCRETE



The Background of **NATIONAL** TRADE-MARK *Carbon Brushes*

PRECISION

EXPERIENCE RESEARCH MATERIALS CONTROL

● The quality of a product is determined, in large measure, by the exactness characterizing its manufacture. For this reason PRECISION is emphasized at every step in the production of "National" Carbon Brushes. This applies to the research on which their production and application are based, to the selection and preparation of materials, to the control of production processes, and to the final machining and finishing operations.

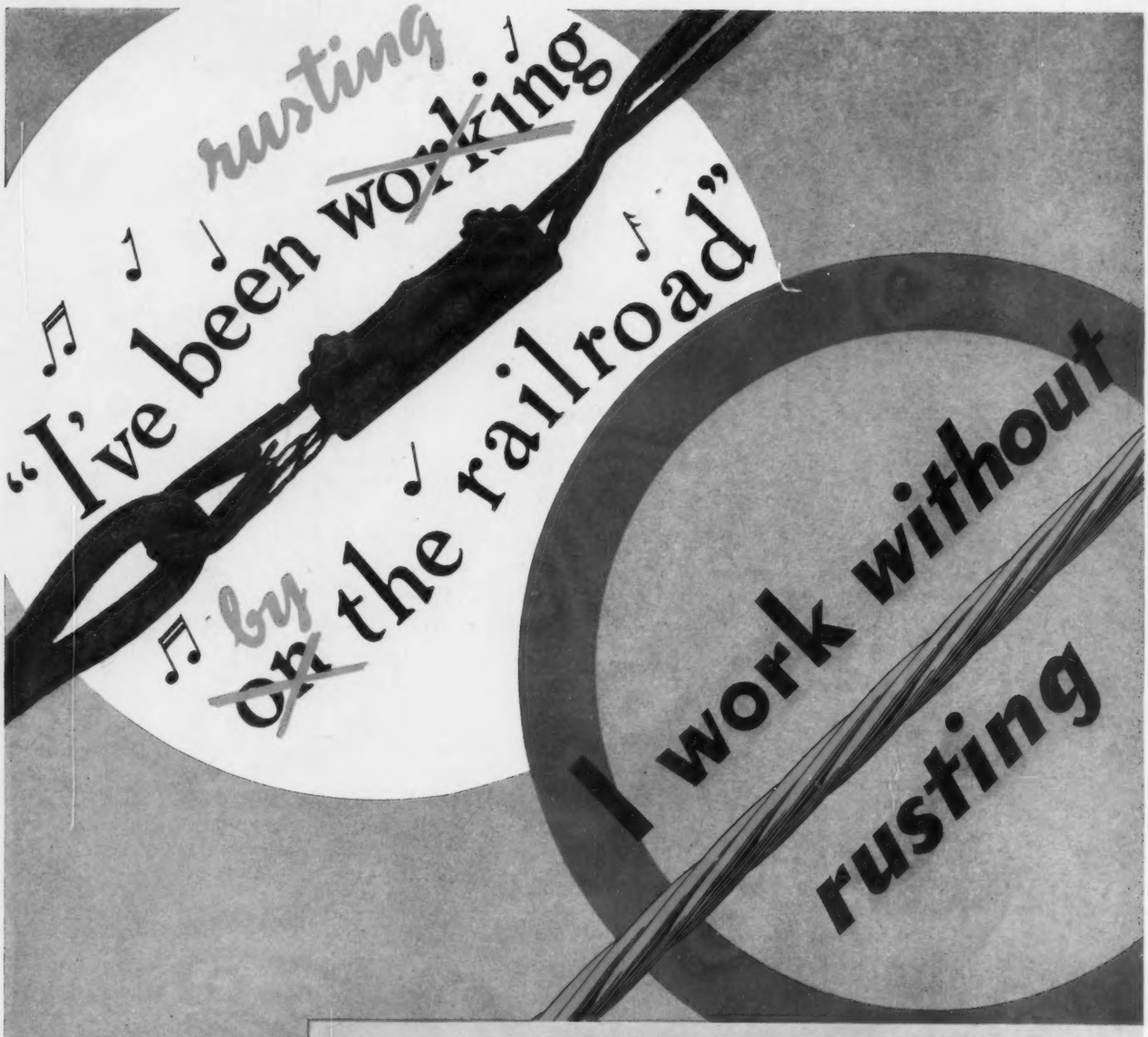
Skilled and experienced workmen, trained to the importance of accuracy as a factor in performance, make *precision of finish* an outstanding characteristic of "National" Carbon Brushes.

Precision of production methods gives "SA" Series Grades leadership in the field of heavy duty service. Let us prove to you their uniformity and dependable performance.

NATIONAL CARBON COMPANY, INC., Carbon Sales Division, Cleveland, Ohio

Unit of Union Carbide and Carbon Corporation UCC General Offices: 30 East 42nd St., New York, N.Y.

BRANCH SALES OFFICES: NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO



. . . . REMEMBER *to* SPECIFY

COPPERWELD

WIRE *and* STRAND

"BY the railroad" or in any other industrial atmosphere, Copperweld guy strand works without rusting because the tough steel core is safely protected by a THICK welded-on covering of pure copper.

THICKNESS of the copper is accurately measured and guaranteed. Forty per cent conductivity wire must have a minimum thickness of not less than 12½% of the wire radius; thirty per cent conductivity wire, not less than 10% of the wire radius—that's why we can guarantee that Copperweld guy strand shall have a life, insofar as corrosion is concerned, comparable to a solid copper wire of the same diameter under the same exposure conditions.*

**You are invited to write for a copy of Specification BW35, which includes complete specifications and guarantee.*

COPPERWELD STEEL COMPANY

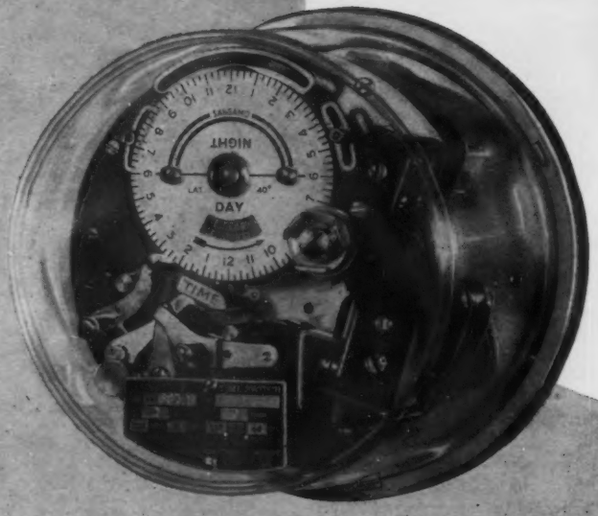
Glassport, Pa.

COPPER · BRONZE · COPPERWELD RODS, WIRE, AND STRAND

when control is required at sun set and sun rise

Form KZ Astronomic Dial Time-Switch in Conventional Case

New SANGAMO ASTRONOMIC DIAL TIME-SWITCHES



Model F, Form VSFZ Astronomic Dial Time-Switch in Socket Construction.

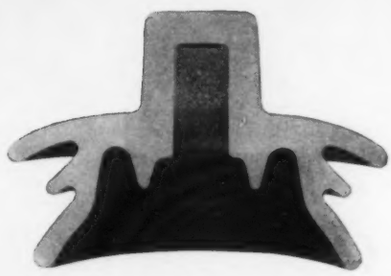
• All the requirements for accuracy and dependability at low cost have long been fulfilled by the Sangamo Form K, and the Model F, Form VSF Time-Switches. The addition of Astronomic Dials now extends their field of application to operate "on" at sunset and "off" at sunrise daily. The "off" operation may be set at any time between 9:30 P.M. and 2:15 A.M. For street lighting, flood lighting, yard lighting, and display window, outdoor sign and air beacon lighting, these new switches provide automatic convenience at economical first-cost.

Bulletin 87 lists complete information and prices on all Sangamo Time-Switches

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

● **Potential trouble spots! That's what lines in dusty areas, smoky industrial districts and fog regions might be termed since fog and other contaminating influences tend to cause insulator flashovers, subjecting the lines to possible failure. To combat these enemies successfully an insulator must have extra high surface resistance, exposed petticoating to allow cleaning by wind and rain, and good corona characteristics. O-B Smogtypes have these features, along with a pin corrosion preventive and other performance-improving refinements. If contamination and fog are problems, install Smogtypes. They'll cut failures—and their costs—to a minimum.**

IT COSTS LESS TO USE O-B INSULATORS



LOOKING INSIDE A SMOGTYPE *

★

Surface resistance is 60 percent higher than in a conventional unit.

Wide-spaced petticoats allow maximum cleaning by wind and rain.

Deep inner petticoat controls flux, improving corona characteristics.

A metal coating in the pin hole prevents any corrosion of the pin.

Rugged porcelain sections decrease breakage from mechanical impact.

*Smog: Defined in *Webster's* as "A blend of smoke and fog"

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For a highly standardized test procedure, or general trouble-shooting around the plant, these WESTON test units . . . like all instruments which bear this name . . . give that extra assurance that means an end to doubt, compromise or trouble.

If you are not acquainted with all instruments in this WESTON portable test line, why not send for complete information . . . Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

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We blew a bubble for a man named Edison . . .

FIFTY-NINE years ago a stranger got off the train at Corning, New York, and asked the station agent to direct him to Corning Glass Works.

He had been sent by Thomas A. Edison to see if Corning could succeed where others had failed, in making a glass bulb to surround the filament of his new electric lamp. Producing the thin bubble of glass for Mr. Edison's first lamp was an early milestone in Corning research. Now, machines developed by Corning produce almost all of the lamp bulbs made in America. Today, "PYREX" power insulators . . . because of their high electrical values and greater mechanical strength, are proving their superiority under severe climatic conditions in the United States and many foreign countries.

Corning has continuously been an important part of the electric manufacturing, communication, and power industries. Corning knows glass, for glass is Corning's only business. For more of the story of Corning achievements, send for illustrated booklet, "Corning Glass Works presents . . ." Mailed free. Corning Glass Works, Corning, N. Y.

CORNING
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OF TROUBLE-FREE PERFORMANCE

3 SIZES

TYPE 680 . . . FOR VOLTAGES UP TO 15,000
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Handle most PRIMARY line requirements

● Here they are! The three invincible HEMINGRAYS! So *tough,* they laugh at old age. So *strong,* they defy the hardest usage and most rigorous service. So *versatile,* they are equally efficient under either light or heavy loading conditions. So *economical,* they reduce initial and over-all costs to a minimum. So *competent,* they overcome outage loss. One for all . . . all for one, these great new HEMINGRAY Glass Brass-Bushed Insulators provide a longer life of better insulator service than has ever been known before. Send for samples . . . subject them to the most gruelling tests . . . and see them *deliver.* Owens-Illinois Glass Company . . . "FIRST IN GLASS" . . . Hemingray Division . . . Muncie, Indiana.

● Owens-Illinois is the world's largest manufacturer of glass containers and producer of INSULUX Glass Block, DUST-STOP Replacement-Type Air Filters, FIBERGLAS Insulating Wool, Insulating Blankets and Filter Cloth.

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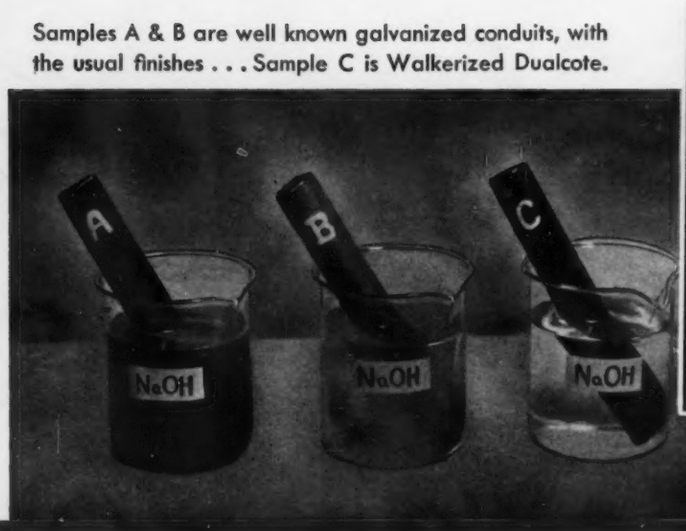

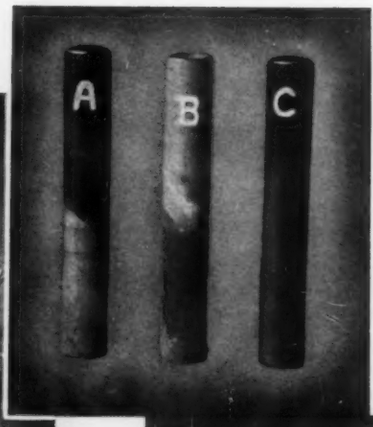

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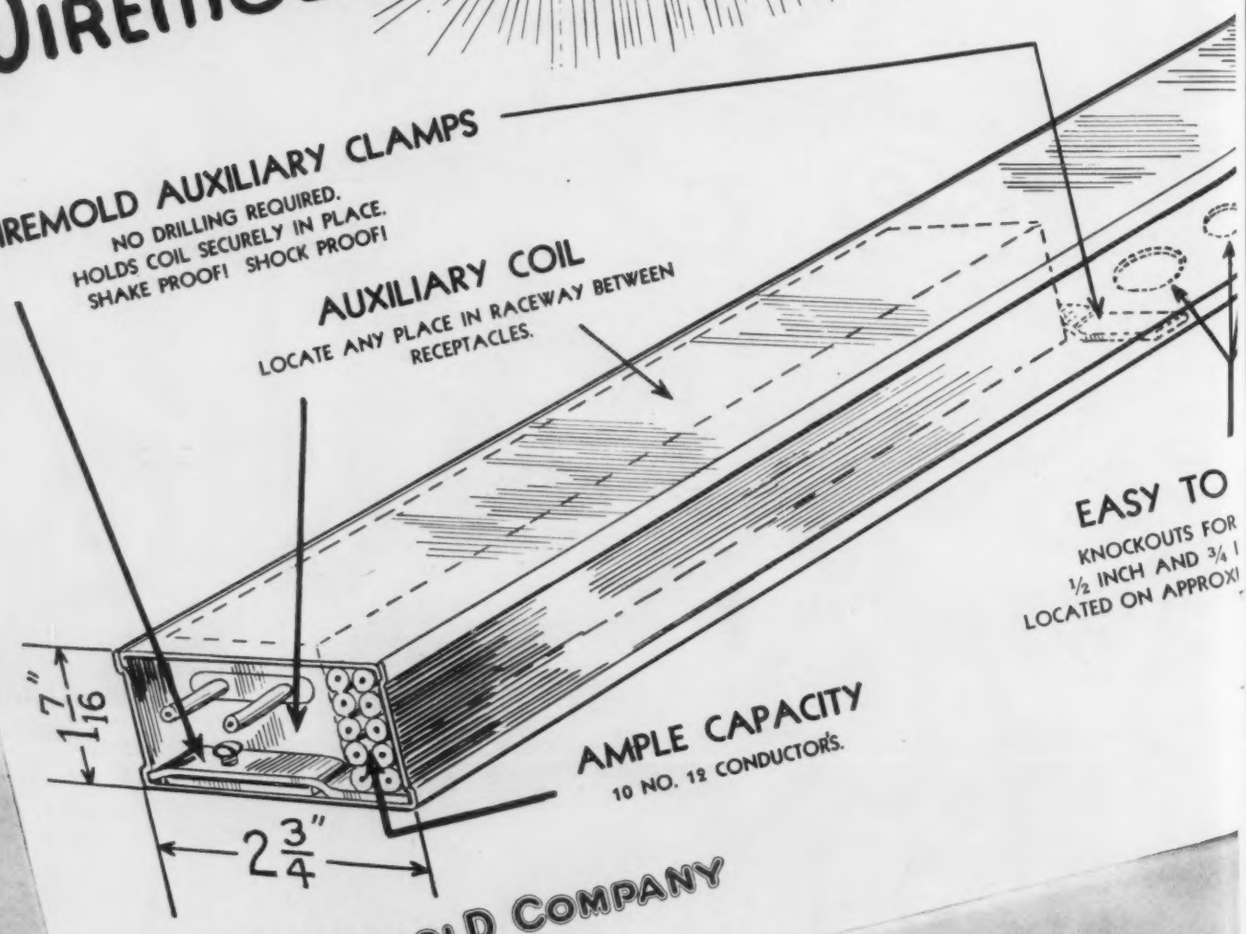

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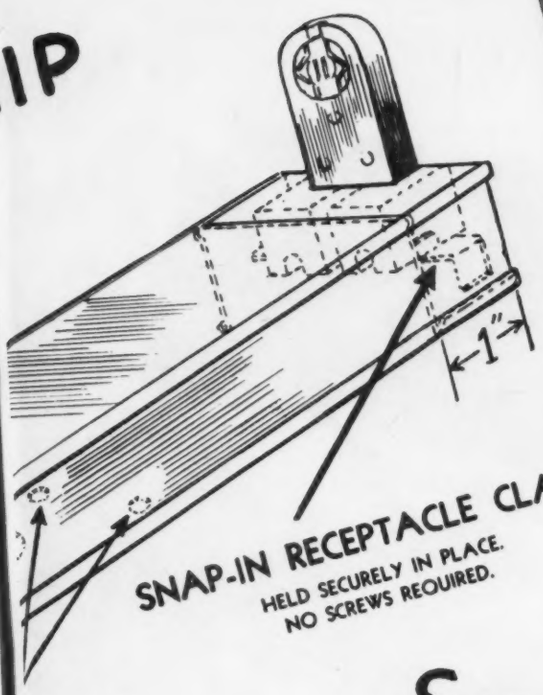

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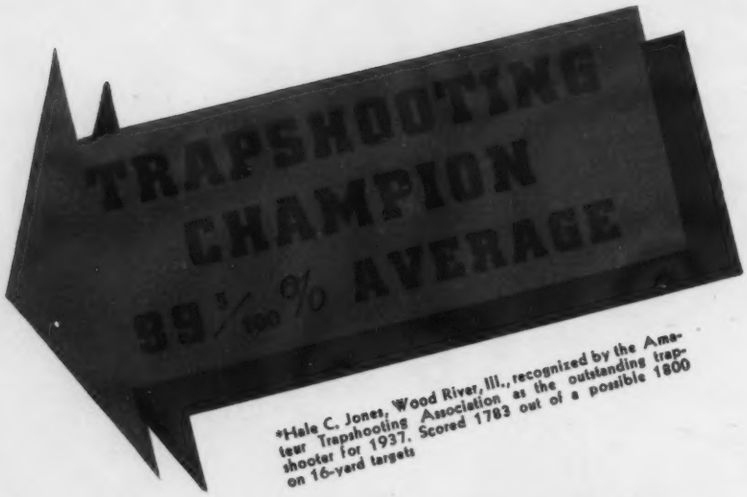
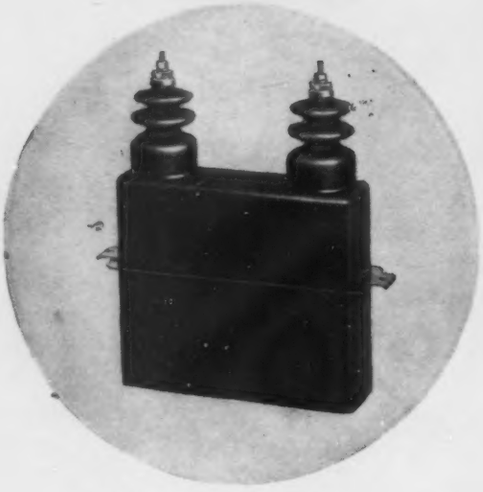


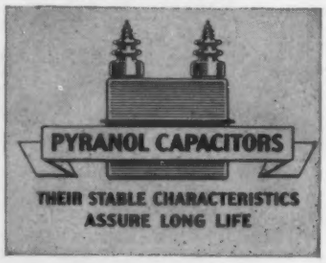
*Hale C. Jones, Wood River, Ill., recognized by the Amateur Trapshooting Association as the outstanding trapshooter for 1937. Scored 1783 out of a possible 1800 on 16-yard targets



PYRANOL capacitors are champions, too. For their dependability has been proved by a service record which is 99.85 per cent perfect. That's why you can install them anywhere on your circuits with absolute confidence.

With these capacitors, you can gain capacity in some of your heavily loaded circuits *quickly* and *inexpensively. Quickly* because Pyranol capacitors are easy to install. *Inexpensively* because of their low first cost, and because Pyranol capacitors require practically no maintenance. Many installations have saved more than their cost in the first year of service, and the savings are continuing year after year.

Remember Pyranol capacitors as a quick, economical, and dependable way of releasing system capacity. General Electric Company, Schenectady, New York.



GENERAL ELECTRIC

360-138

PUBLIC RELATIONS

FOR THE

ELECTRICAL INDUSTRY

•

A Presentation of the Imperative Need of Mutual Understanding in the Conduct of Our Daily Work in the Eleven Western States

ELECTRICAL WEST

A McGraw-Hill Publication

Understanding Wins Friends

TO THE READERS OF ELECTRICAL WEST:

THERE is no doubt that today the American people are taking a keener, more critical interest in the conduct of business than ever before. And when I say critical, I mean exactly that. During recent years most of them have suffered loss, either of jobs or of savings, and under such circumstances men are prone to accept without serious question any scapegoat that appears plausible. In the confusion of fears and resentments, they seem to have concluded that short-sighted and selfish business management is chiefly responsible for their misfortune.

However mistaken and unfair such conclusions may be, management cannot ignore them. It must recognize that in the long run, the opinions of men are the result of experience, of what happens to them each day, much more than of what they are told.

Progressive management has already faced that fact; has already begun to think and work beyond the technicalities of production and distribution that once absorbed most of its energies. It sees more clearly and deals more proficiently with its human responsibilities. It is learning to reconcile the economic success of the industrial unit with social welfare of worker and community.

Presently, every business—the small retailer as well as the large manufacturer—must learn how to interpret more convincingly to its own public the social as well as the economic benefits of its policies and accomplishments. Only as each business satisfies the newly aroused and critical interest of people in its affairs will it be able to disarm those who trade on the human tendency to blame our troubles on someone else. Yes, if business as a whole is to win a favorable public opinion, each and every business must act to improve its own public relations.

The readers of this journal, and of other business publications, compose, we believe, a group that can achieve for American business a sound and lasting solution of this vital problem. They alone are in position to shape the working conditions of 21 million employees. They alone can mould the attitude of those other millions who compose the various "publics" to which all business must be responsible.

Heretofore, the function of business papers has been to exchange successful experience; to dig up and disseminate practical facts for the use of their readers, serving primarily the technical and merchandising needs of business. But this matter of human relations has now become of equal importance, for good industrial and public relations, it has been found, reduces corporate losses, removes fear and suspicion, promotes operating efficiencies in both production and sales. A better knowledge of public relations technique is, therefore, quite properly essential for men in, or moving into, positions of greater executive responsibility.

So, beginning with this insert, each McGraw-Hill publication sets out to strengthen its editorial service in the important domain of Public Relations. I hope that the million readers of McGraw-Hill's business papers will get much real and practical help toward building better relationships between their own businesses and their employees, their customers and the communities in which they must carry on.

James H. McGraw Jr.

Why a Public-Relations Program

IN less than two generations the U. S. has changed from an agricultural to an industrial nation. Living standards and efficiencies at once the despair and envy of other countries have been created. Foreign delegations still flock to our shores to study our methods so that they may use them as patterns for their own organizations. Yet here at home today these methods and the systems responsible for them are under increasing attack.

Since every person employed in productive enterprise is a part of American industry, these attacks imperil the livelihood of nearly 40 million workers and their dependents. The newest addition to the payroll has as much—if not more— at stake as the veteran business executive. That also is true of particular industries which at present may not be under direct fire. All industry is so interrelated and interdependent that even the seemingly immune enterprise must suffer when the legitimate activities and the buying power of their customers, or the customers of their customers, are curtailed.

Ironically enough, public acquiescence in many of the current attacks is an indirect recognition of the satisfactory manner in which our industrial system normally functions. Reasonable opportunities for the employment of those ambitious to put their mental or physical talents to work and continually rising standards of living have come to be widely accepted as a matter of course. Any unfavorable change in these conditions leaves the general public surprised, confused and resentful. Such reactions as these make it easy for pressure groups to unloose destructive propaganda which further heightens resentments and breeds new misconceptions.

These misconceptions take many forms shaped by the experience, the inexperience or the special interests of the critics. To one it appears that business can't manage itself and must be owned and managed by the government. Another believes that employees are underpaid or that stockholders and executives are overpaid. To others corporate surpluses are too high. Many have convinced themselves that power and machines have reduced employment opportunities; and that industry can raise wages and reduce prices while costs go up.

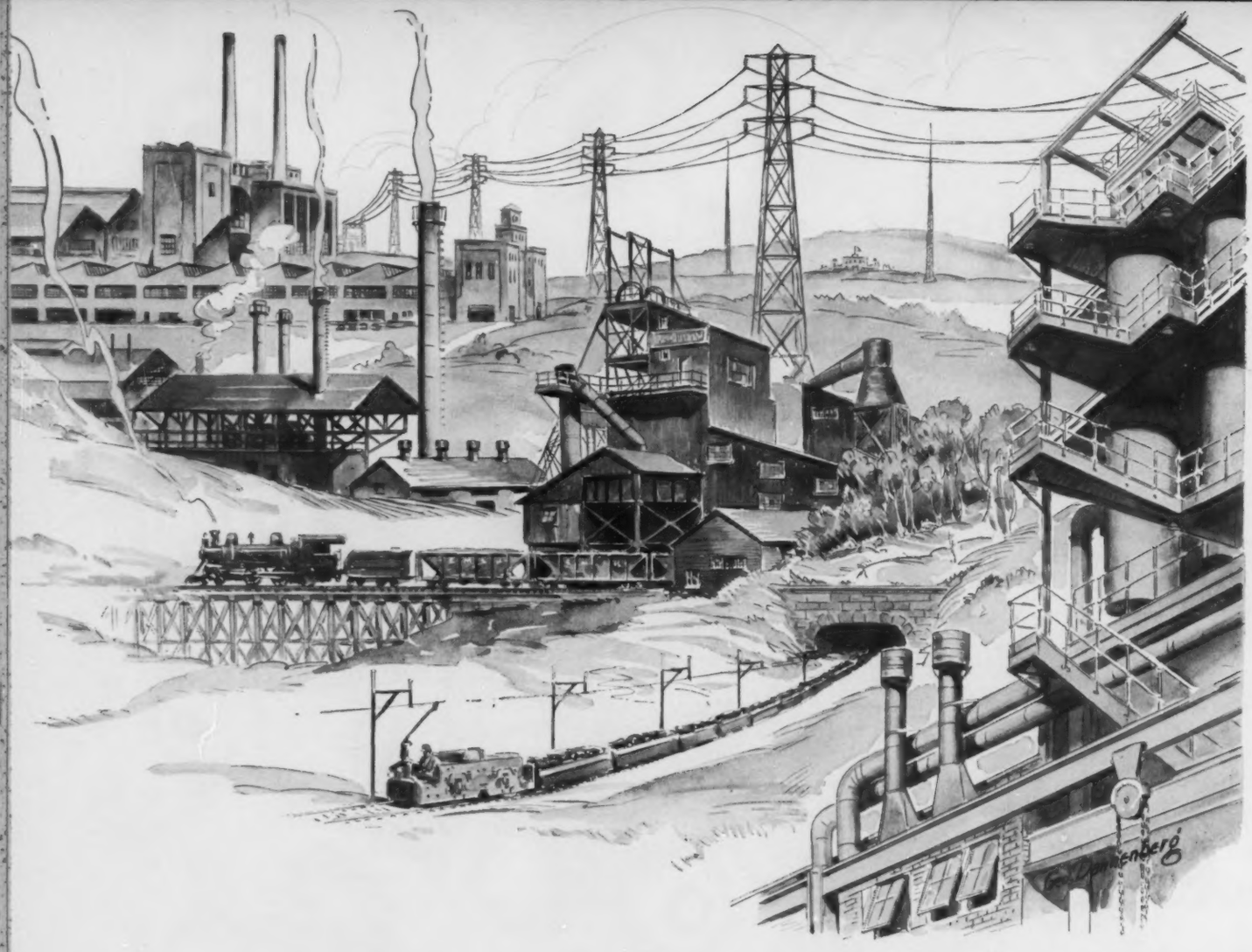
Several misconceptions are based on faulty generalizations. Because a few companies have been remarkably successful, it is argued that all could make money. Because some corporations have been ruthless, all corporations, it is contended, will stoop to unethical conduct to gain their ends. This is like saying: John Smith killed Bill Brown; John Smith is auburn-thatched; all redheads, therefore, are murderers. Unfortunately, those who would indict all business for the crimes of a few are more subtle in their approach and so create an impression not in accord with the facts.

To put it bluntly, American industry, once so highly praised for its contributions to the national well-being, is now on the spot. Prevailing misconceptions of how business operates and what it does have made a field day for those who propose to hamstring or destroy private initiative and individual opportunity. These proposals run a broad gamut: They include public ownership, increasing and rigid federal control at the expense of local autonomy, ill-conceived legislation on hours and wages, labor dictatorships and confiscatory taxes on thrift and employment security.

WHILE the man in the street may be criticized for his willingness to swallow these nostrums, he is not wholly to blame. Industry, too, has been at fault in assuming either that he was fully informed on those phases of its operations which are properly a matter of public interest, or that a healthy curiosity should be discouraged. Misconceptions multiply where the facts are hidden.

The tragedy of the situation lies in the fact that it might easily have been avoided.

Dependability WINS Friends



In the simple days of local and localized industry, everybody connected with a particular enterprise knew everybody else connected with it, and the details of its operations were an open book. The boss and the employees were neighbors; the customers, for the most part, fellow townsmen. Outside purchases were limited largely to those products which the local community neither manufactured nor raised. Competition in the modern sense was practically nonexistent.

As industry developed and enlarged its field of operations, much of this early, intimate, personal touch was lost. The small enterprise grew bigger. In some cases combinations took in the local business and financial control passed out of the community. The local industry which still retained its identity was busy meeting increased competition and seeking to expand its distribution. Little attention was paid to changing conditions that were fostering misconceptions about the personal relations of the business. Bit by bit the close acquaintance and familiarity of the early days disappeared.

COMMON understanding of these things also was impeded by the greater variety of occupations as industry expanded. Each man's job became so highly specialized that the old feeling of common partnership in a joint undertaking frequently was buried in an exaggerated feeling of the relative importance of his own work. This made it easy for each occupational group to get the idea that its contribution to the undertaking alone was essential and that many of the other groups were parasitic or, at best, unimportant.

Such mistaken beliefs are the exclusive property of no particular group. "Goods are valueless until sold," chants the sales staff. "Without us the wheels of industry would cease to turn." The wheels would turn much faster, growls the production department, "if we didn't have so many lame-

Gratitude
WINS
Friends

Veracity
WINS
Friends

brains drawing fat salaries as salesmen." Under the cold glance of both groups, the clerical force heatedly inquires: "How long do you think this business would last if we didn't keep the cost records, send out bills and collect the money for pay checks?" Some executives and engineers, too, have been known to forget that their plans cannot be carried out without the cooperation of other groups.

Possibly the greatest single cause of misunderstanding and friction has been fuzzy thinking on social responsibilities. Many of the responsibilties which rested on the individual or the state in our fathers' and grandfathers' days have been shifted to the shoulders of industry. New ones constantly are added or proposed—often before industry has had time to adjust itself to those which have gone before. Some of these responsibilities affect employee relations; others involve customer relations. The worker, for example, no longer is completely defenseless against the occupational hazards of his employment. "Let the buyer beware" no longer is considered smart merchandising. Many of the changes now embodied in the laws were anticipated by industry itself. Opposition to social legislation, however, has been used to damn business in the public eye.

FORTUNATELY, the barriers to good will and common understanding can be broken down. The process is a simple one. It consists chiefly in maintaining good policies in human relationships and in keeping all interested people—employees, stockholders and their neighbors, customers and the general public—informed. It means telling them in plain terms what revenue is received and where it comes from; what revenue is paid out and who gets it; how an industry serves the individual, the community and other industries. Finally, it includes the acceptance of the social responsibilities which the advance of civilization imposes upon business.

Add all these things together and you have public relations.

Most employers are willing to accept their social responsibilities, but they are inexpert in making that acceptance articulate. Too many employers have failed to make clear their policies, their practices and their purposes as they relate to fair dealing with employees, investors and the general public. Their intentions have been good, but they have cloaked them with a veil of secrecy and made a mystery out of simplicity. As a result, the uninformed have been given a royal opportunity to exercise their imagination. And they have done it!

Public relations is a comparatively new activity for most business enterprises and involves a technique which too many have not yet learned. Obviously, the first place for each company to start is within its own organization. This is the "inside job" that builds a company's good name among its own family and lays the firm foundation for building public confidence and favor. As one exponent of the art phrases it: "Industry's public relations cannot be one thing and its private actions and policies something else. The two must be in complete accord."

The inside job should present no real difficulties to fair-minded employers. Most workers have a normal predisposition to view in a favorable light the organization in which they earn their livelihood. Most companies endeavor to conduct their operations so as to justify that favorable attitude. But too few of them are adept at dramatizing the facts that furnish a substantial basis for maintaining employee goodwill. So, where misunderstanding and suspicion born of ignorance exist, time may be required to break down the barriers that have grown up.

The task of telling this inside job to the outside world, however, will not be easy for two reasons. First, it has been so long neglected that the backlog of misunderstanding is large. Second, public relations involves attitudes as well as actions, a viewpoint as well as an organization. Public relations is not a commodity that can be purchased like a car of coal or a bolt of silk; neither can it be sold by "canned" material. Each program to establish sound public relations must be individualized and indisputably stamped with the personality of the company promoting it. AND THE DEED MUST ALWAYS BACK THE WORD!

But the task is worth the effort. For, with the inside job right, a properly conceived and intelligently executed public relations program offers business the means of successfully counteracting unjust public suspicion, unfair political attack and unwarranted outside dictation. The need is urgent.

Tact WINS Friends

A Program for The Electrical Industry

ANY man working at the electric business cannot be said to be promoting good public relations unless he can count off on his fingers specific activities which he is consistently pursuing to that end. Furthermore, these activities must be, not what he thinks will work, but what has been proved to work.

Good intentions are not enough. Good public relations must be created from day to day, continuously, by everyone —through actions which are deliberately and carefully planned.

It is helpful and convenient, in the case of an organization, to think of a public-relations program in three parts:

1. Relations between company and employees. 2. Relations between company and customers. 3. Relations between company and community.

TO exaggerate the significance of good relations between a company and its employees is almost impossible. In the first place, a company is its employees. In the second place, electric companies are subject to keen public curiosity, and each employee, within his circle of friendship, is the exciting source of "inside" information for that group.

Good relations between company and employees, like friendship, rest on understanding. This means the company must know, exactly, what its employees are thinking, feeling and desiring, today (not yesterday). Likewise, the company must take pains to explain itself to its employees.

THESE are a few "musts" for good company-employee relations:

1. Decide labor problems through discussion between management and employees.
2. Make employment policy definite and comprehensive and such that employees feel they are a part of the business.
3. Keep employees well informed, and in detail, as to policy, rates, finances, operation, etc., etc. Observe that such information, when learned through group meetings and discussed by all, takes quicker and sinks deeper.
4. Make an executive responsible for personnel relations and provide for measuring the plan's success, keeping it alive and adapting it to change.

Relations between company and customers proceed according to well-formulated principles. Suffice it to recall to contractors, wholesalers, dealers, utilities and everybody else that a customer is not necessarily a friend. He must be given reason to feel friendly, and more reasons to keep feeling that way.

Relations between company and community have, for electrical men and women, special meaning. To most utilities, community and customers are practically the same, and the vital contact-group is the utility's employees. But to every electrical enterprise, be it utility or one-man retail outlet, the community is a pool of interests, in which dozens of electrical enterprises function.

TO electrical men and women, good relations between company and community are first of all contingent upon one thing: good relations between the electrical industry and the community. Try as it may, one branch cannot create good relations when three other branches are knifing it in the back.

Here's a starting point for good relations with your community: (1) Learn more about the other branches of your industry. (2) See that your community program protects the program of each other branch.

Consider a war in Europe. Estimate the economic loss from friction between nominally independent, but actually inter-dependent states. Apply that lesson to your business. Here in the West, the machinery for adjusting differences—for eliminating friction between the industry's units—is established and at work. Honesty, sympathy and willingness will bring a cooperative understanding. And understanding wins friends.

Kindness WINS Friends

Where the Electrical Dollars Go

UTILITIES

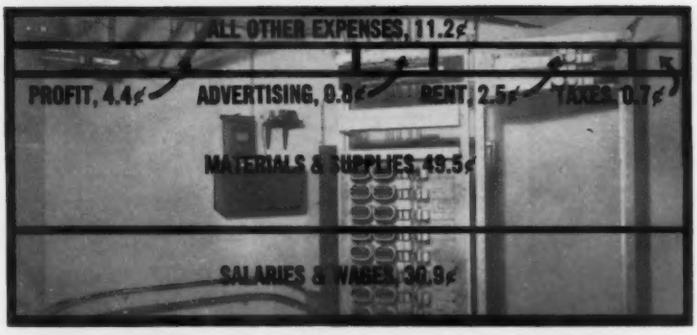
Have two kinds of expenses. Those which are within the control of the management — operating expenses; and those not in the control of the management — fixed charges. Of their total expenses, 37.7% fall in the first class; 41.5% in the second. Executives salaries comprise 0.4% of the total salaries and wages.

RETAILERS

Must, of course, spend more money on goods to be sold than any other group in the electrical industry. And because their establishments are, on the average, small and their investment proportionately high, the owner receives almost half—8.9%, to be exact—of total spent on salaries (and commissions) and wages.

CONTRACTORS

Range in size from one-man concerns, where the owner does all the work, to million-dollar concerns employing scores of people. As a result, employers' salaries are relatively high — 13.5%. Employees' wages, however, are still higher. Comprising 17.4% of the total, they rank next to materials and supplies.



MANUFACTURERS

Are very heavily capitalized. They must therefore always bear in mind their stockholders. Despite this requirement, they set aside only 5.2% of their income for this purpose. Employees receive nine times as much in salaries and wages. In addition, 1.2% goes to group insurance and annuities to retire employees.

Self-Control WINS Friends

Electrical Men Have Done To Help

THEY HAVE MADE LIFE EASIER

Electricity is many things to all men. Even doctors, scientists, teachers—those who are generally given credit for improving life—are dependent on it. A detailed list of the electrical industry's accomplishments would fill hundreds of pages.

Electricity has made it easier to find jobs. It has itself accounted for a score of new industries—the refrigeration industry, the new air-conditioning industry. Its use in older industries has made possible mass production. It has promoted efficiency. It has so lightened the task of the worker that he can now do more work, earn more money for his employer, secure higher wages for himself.

Electricity has eased the farmer's job. Electric pumps have ended worry over droughts. Soil-heating cable has reduced seed mortality and doubled profits.

Electricity has freed the housewife. It has conserved her energy; preserved her appearance. It has lengthened her leisure time and increased her enjoyment of life.

AND SAFER

Similarly, electricity has made life safer. Today a man or a woman or a child can undertake some job, launch on some venture with the assurance that all the human ingenuity of the electrical industry has—is—working to protect him.

Electricity has lessened the perils of traveling. Brilliant highway lighting has sharpened the night-driver's eyes. High-powered beacons keep the airplane on its course. Fog-horns and fog-lights steer the ship from deadly reefs. Automatic signals slow the hurtling speed of the new streamlined train.

Electricity has conquered disease. Foods are canned and bottled by electric machines which have replaced dirty hands. Doctors' implements are sterilized electrically. Ultraviolet lamps kill the microbes of the operating room.

Electricity has stopped the crippling accidents of the factory. Better light has uncovered the cogs and cutting edges of the machine. Hoists and endless chains have saved muscles which formerly were torn.

AND LONGER

Electricity has made life longer. Not only because it has given rise to purely health-making inventions such as the sun lamp, but because it has also made life easier and safer. No biased claim can offer better proof than the letter of a Seattle housewife:

"My mother," she wrote, "died at the age of 36, before electricity as a servant was revealed. Overwork had a part in it.

"I was never as strong as mother, yet with the electric aids I have had, I am today a grandmother and accomplish more with less effort than she could possibly do.

"When my children were babies I found running the sewing machine the severest tax on my strength. Every sewing session meant a visit to the doctor, who finally ordered no more machine treadling.

"For a while I tried having one of the children turn the treadle. Then my husband bought me an electric motor attachment, and my trouble was corrected without a threatened operation and never returned."

Courtesy
WINS
Friends

All These Things and More
Mankind

BAKING IS SIMPLIFIED

STEPS SAVED IN KITCHENS

EFFICIENT FACTORIES

FASTER IRONING

NO MICROBES REACH MILK

CONTROLLED HOISTS PREVENT ACCIDENTS

LESS PERIL IN NIGHT DRIVING

PURIFIED AIR FOR MOTHER & CHILD

SUNLIGHT AT HOME

BETTER LIGHT BETTER SIGHT

MORE TIME FOR LEISURE

Sympathy WINS Friends

One Electrical Cent Will Buy--

FIVE HOURS OF LIGHT—Which means proof against headaches, nervous strain, loss of sight, spectacles. Ability to do more work. Greater enjoyment of life. A safer, more beautiful home.

TWENTY-FOUR CUPS OF COFFEE—Which means a speedier, yet more leisurely breakfast. A scientifically brewed, consistently good beverage. Relief from flushed heat over the kitchen stove.

CLEAN CLOTHES FOR TEN PEOPLE—Which means an end to big laundry bills. Need of fewer clothes. Longer life for those you have. No more backbreak. Time for outside activities.

RELAXED RECREATION FOR MORE THAN TWO HOURS—Which means cheap entertainment by the world's greatest, most interesting artists. Banishment of lonesomeness.

SIX SPOTLESS ROOMS—Which means a dustless, dirt-free, healthy home. No more tiresome sweeping or bending down. More leisure. Removal of grit and dirt which wears out rugs.

FIVE HOURS OF REFRIGERATION—Which means better food preservation. Protection of health. Savings in fuel, time, steps, space, buying. Easier entertaining. Ice for all occasions.

Unselfishness WINS Friends

Western Life Is Electrical Life

ONE of nature's great forces for progress is electricity.

Its availability brings to the community, the home, business, agriculture and industry a willing servant with unlimited capacity for good. Few other sections of the nation have enjoyed the blessings of electricity as extensively and as cheaply as has the Far West. Here the public and its electric utilities have been interdependent. Here an abundance of electric power has been provided through the initiative and resourcefulness of companies which have been keenly aware of their responsibilities to the region. Growth and progress have been anticipated so that supply has always been ahead of demand. Rates have been progressively reduced. Service has been made universally available along highways and byways, to cities and hamlets.

What has all of this meant to the West and its people? Net result has been the development of an electrical use and an electrical consciousness that challenges comparison. The consumption of 1,650 kilowatt-hours per capita per year is 78 per cent higher than the average for the nation. Another way of stating the same thing is that 10 per cent of the country's population resident in this area uses 18 per cent of the electrical output of the U. S. These are cold statistics; their interpretation to the public must be in terms of human values.

Here are some of electricity's contributions as a social and economic asset to this region:

TO the farm the industry has brought an abundance of water in arid regions so that the desert might provide a livelihood. It has made possible new and more lucrative crops so that the economic status of the farmer might thereby be improved. It has given the farmer a new worker whose wages are low and that does not shirk or strike. Over half of the farms of the West enjoy these advantages. This is a higher ratio than for any other equal area in the world.

To the home the industry has brought a willing and economical servant. It has placed an electric range in one Western home out of every six; a refrigerator in every other home. Practically every home connected to the power lines has the enjoyment that comes from radio. It has brought the healthful benefits of better lighting to millions of homes. It has provided the housewife with home-service aids to make electricity an even more efficient servant.

TO business the industry has brought the sales-stimulating advantages of good lighting in windows and stores. It has brought the comfort of air conditioning, the desirable features of electric heating. Many merchants have built profitable business through the sale of electrical appliances.

To industry generally the availability of electricity has removed the limitations of plant location. It has put power at the hand and under the control of the worker so that his task might be easier and his ability to produce greater. It has permitted decentralization, with its attendant benefits of industrial stability, security and efficiency. It has contributed to mass production of all kinds of manufactured goods, thereby bringing costs down to a level within the ability of low-income groups to purchase.

IN the accomplishment of all these things, the electrical industry has been a good citizen. It has helped to attract new industries which would provide new markets, new jobs and new purchasing power. It has shouldered its share of community responsibility, carried an increasingly large burden of taxation. It has provided for its own people stability of employment at better than average pay.

The industry is not resting on these laurels. It is striving to make living better, to make leisure more enjoyable, to make human tasks less burdensome. It looks at its past merely as an inspiration to the future.

Honesty WINS Friends

Electrical Men Are Interdependent

IF a more cooperative society is the aim of present pressures, then the electrical industry should be more imitated and less censured. For it has practiced this theory longer than any American industry. In no other is there so long a record of practical, sound, comprehensive, working cooperation as in the electrical industry.

That this cooperation is not yet perfect is probably the best answer to any impatient theorist who demands an Utopian society—right now. Although other industries have nowhere nearly so much practical experience in working problems out together, the electrical business still feels that it has far to go to attain perfection.

Its efforts have always been realistic. There has been no lack of altruism—but the practical considerations, without which no theory can work, have always been dominant. Early it was recognized that there must be mutual benefit in the solution of any mutual problem.

When the NRA was offered as a cooperative means to handle the problems of business and industry, the electrical industry, used to cooperation, was first to volunteer codes of self-regulation. After this governmental instrument of compulsory cooperation was declared unconstitutional, voluntary cooperation persisted — and still persists—in the electrical industry.

A long experience in cooperation has convinced leaders in the industry that the markets, the distribution of goods and services, the major competitions of any single group or branch of the industry are the same for all, with only detail differences.

THE manufacturer of electrical machinery or supplies has been and is dependent upon the utilities to create the energy to operate his products; upon the wholesaler and distributor for warehousing and serving the trade with those products; upon the contractor for installing them and the means by which they receive power, and upon the dealer for creating a demand for and selling them.

In like fashion the utility is dependent upon the manufacturer to create equipment —through research and production— through which the electric energy it generates may be utilized and hence sold. The contractor, preparing the pathway for electricity to find its utilization, is dependent on both the manufacturer, for his materials and for creating a demand for the product, and the utility, for selling the idea of that use to the ultimate consumer.

WHEN the product goes through a dealer, that dealer is dependent, whether he knows it or not, upon the manufacturer for quality and for national advertising that creates a demand for the product. He is dependent upon the utility to supply it with the energy to make it a satisfactory purchase by his customers. He is dependent upon the contractor who installed the wiring for the convenience with which his customer may use the device.

Wholesalers, as the middle men, serving both the manufacturer as a distributor of his products and the dealer or contractor as a convenient source of supply, are dependent upon every other branch of the industry.

When this chain of distribution is understood its logic is immediately apparent. Each group is necessary to efficient distribution. By the cooperation that has been developed, this efficiency has been so increased that today products reach the customer at a fraction of the cost they once demanded. This interdependence has resulted in a bigger electrical dollar's worth to the public every day of every year.

Tolerance
WINS
Friends

What Makes up the Cost of Electricity

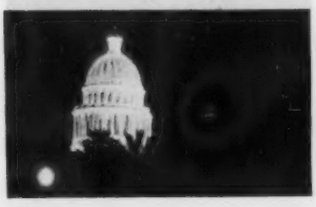
BECAUSE FIXED CHARGES REQUIRE A LARGE PROPORTION OF OUR INDUSTRY'S EXPENDITURES, PRODUCTION COSTS DO NOT GREATLY AFFECT THE PRICE CHARGED FOR ELECTRICITY.

Production, 12%

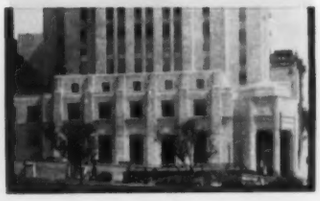
Shipping, 8%

Selling, 7%

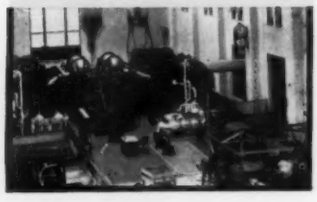
Taxes, 14%



Rent, 4%



Maintenance, etc., 9%



Depreciation, 10%

Bond Interest, 14%

Dividends, Surplus, 22%

THEREFORE THOSE PEOPLE WHO CLAIM THAT ELECTRICITY IS NOT SO CHEAP AS IT MIGHT BE SHOULD BE TOLD THAT EVEN IF PRODUCTION COSTS WERE CUT IN TWO THERE WOULD BE LITTLE OR NO DIFFERENCE IN THE COST OF ELECTRICITY.

Recognition WINS Friends

The Electrical Industry's Investment Per Worker Is--

UTILITIES require a greater investment and must sell a greater annual volume of their product per employee than almost any other business. The power companies must expend a total of $50,000 to make a job for one worker; to keep him working, their annual sales of electricity must total $7,900.

RETAILERS can't just go into business. They require capital. The average investment behind each employee is $2,900. That's how much it takes to make a job. To keep an employee working, the average annual volume of appliance sales must be $6,850 per employee. The salesman must produce more.

CONTRACTORS have to back their business with money—for automobiles and trucks, tools, equipment. On the average they have an investment of $1,750 for every worker they employ. Then to keep a man working, they have to do an average annual volume of $7,650 worth of wiring business.

MANUFACTURERS must back their workers with adequate capital invested in plants and machinery. In electrical manufacturing the average amount of assets behind each worker—the money necessary to make a job—is $5,100. To keep the average worker on the payroll, sales must be $4,700.

WHICH MEANS THAT MANAGEMENTS CANNOT PROVIDE JOBS UNLESS CAPITAL IS AVAILABLE FOR EXPANSION; THEY CANNOT KEEP WORKERS EMPLOYED UNLESS BUSINESS FLOWS IN NORMAL VOLUME

Helpfulness WINS Friends

Some Basic Facts for Electrical Contractors

DOES the electrical contractor really need to worry about "public relations?" Is his business the kind that need be concerned with what the public thinks? Isn't it a business within another industry, and isn't the contractor's chief customer the general contractor—often an antagonist rather than a customer? As far as his relations with his men: Isn't labor just a commodity in contracting—to be bought and paid for as needed? Does the contractor really need the goodwill of the utility, manufacturer, wholesaler? . . . . He does.

Let us examine the contractor's need of public relations. He requires:

1. Better interpretation of his kind of service to his customers—(a) the builder or general contractor, (b) the industrial plant or commercial establishment and (c) the householder.

2. A different relationship with his men, so that they can understand their share of the responsibility of making the public appreciate and want more of their joint services.

3. A healthier relationship with his natural allies — his wholesale supplier, the manufacturer, the utility.

From an appreciation of the part that some of the services he can perform for his customers, in promoting better public and employee relations for them, there is a market for the contractor. This is the opportunity side to public relations that the contractor may not have appreciated. It is worth further thought.

IN turn, how may the contractor tackle each phase of this public-relations job of his? What can he do to bring back to the contracting business the fruits of better friendship and greater respect from the customer, from his men and office force; from his allies in the electrical industry? Then, how may he bring to the attention of his customers some of the conveniences and services of electric equipment—better lighting, healthier working rooms, drudgery-saving machinery — and thus develop more business for himself, his crews and those who supply him?

Wise contractors have always cultivated certain architects and general contractors either because of personal acquaintance or because of more direct business purposes. Others have tried to wean away a friendly general contractor or architect from competitors by price cuts. This always creates ill will. Few have developed a respect for quality of workmanship, a fair treatment of the general contractor's customers or a helpful, creative attitude that assists the general contractor to sell himself to the customer, even though it be at a higher price.

Successful contractors seek to avoid price competition by looking at the job to be done from the customer's point of view and suggesting improvements that the average person cannot visualize for himself. From such thoughtfulness, friendship and respect are built; and on these a contractor's business can grow healthier.

THE contractor who wants the friendship of employees will not be satisfied with a union agreement as the limit of his responsibility. With his men, either through the union or not, he will seek ways to spread employment, minimize the peaks and layoffs that justify a wage scale often so high as to make it impossible for him to compete with the plant electrician, the handyman, the amateur wireman at home. Perhaps jointly, he and his men should study ways to encourage maintenance wage scales or modernization scales on off-peak periods.

With his industry allies the contractor has more to gain from action in the spirit of the "Pledge of Cooperation" than in resistance-breeding antagonism. Association work should be not alone defensive, but unselfish too. Friendships that bring help and profit are better developed in a spirit of sincere, unselfish give-and-take.

Some Basic Facts for Electrical Wholesalers

AS so-called "middleman", the wholesaler's problem in these days of sponsored consumer cooperatives is that of proving that his place in the chain of distribution between manufacturer and consumer is necessary and that he performs his function more efficiently, more economically, with better and quicker service than would be possible by shunting him out of the chain.

His problem is complicated by the fact that his means of reaching the public are so limited. But because he is closer to his personnel than is the large manufacturer or the big utility, and because his staff contains trained salesmen, he can often do a far more potent job than others in the industry.

To carry his message to the public he must also depend upon his customers — which means that these customers must sincerely feel him to be an indispensable member of the family. Feeling thus, they will help to defend him and will not be tempted themselves to seek his elimination from the chain of distribution.

His public-relations problem, then, consists of (1) fully acquainting his customers and employees with the services a wholesaler performs and (2) providing for his employees such physical equipment as will make their conditions of employment favorable — furnishing them with the opportunities for advancement and recognition which will stimulate loyalty and enterprise.

Opportunities for the wholesaler arising out of the public-relations programs of other businesses will develop in the sale of lighting, air conditioning, ventilation and similar equipment. In order to sell these, his own salesmen should be acquainted with the benefits they offer a customer in improved working conditions and happier surroundings.

As interpreter of one branch of the industry to others, since all are his customers, the wholesaler can be the leavener of understanding and good will for the entire industry.

THESE SERVICES THE WHOLESALER PERFORMS—

1. Simplified purchasing. By assembling into a single warehouse the products of many manufacturers, he acts as a purchasing agent and advisor to his customers, who therefore have fewer salesmen to interview, fewer orders to write, shipments to handle, invoices to check, etc.

2. Reduces stock carrying costs. By carrying the stock for his customers, the wholesaler saves them the costs of handling, depreciation, obsolescence, idle investment, floor space, insurance and taxes, freight and cartage and theft.

3. Furnishes the right materials in the right quantity, at the right time, on the job. Renders efficient delivery service.

4. Spreads the cost of distribution for the manufacturer by reducing his warehousing, selling and production costs.

5. Makes prompt adjustments, saving time and bother, avoiding expensive delays. Provides a double guarantee—the manufacturer's and his own.

6. Meets emergency demands for extra stock, or for return of overstock, thus saving on inventory cost and handling.

7. Reduces estimating costs for contractors by furnishing up-to-date quotations on needed materials and equipment. Consolidates materials from many sources.

8. Carries credit responsibility, facilitating the operations of his customers.

9. Furnishes data—catalogs, engineering information, advertising and sales promotional material.

10. Assists in developing markets for new products, in getting full distribution of old products. Thus builds load for utilities, creates business for dealers and contractors.

ELECTRA'S HUSBAND

Bucking the Labor Racket

"IF we had a son, I'd send him to college to specialize in labor relations," Electra said the other night, seemingly just by way of making conversation. "I think he could make a fortune if he could learn how to handle a labor dispute."

"You must have been down town passing through picket lines," I countered. "And your imaginary son would probably turn out to be a braintruster. It takes more than a college education to buck the labor racket today."

Here are some of the experiences selected at random from the stories told me by the young chaps who come into the office looking for help in finding a job:

There was the keen young mechanical and electrical engineering graduate of one of our top Western universities. He got out in 1934 when things were really tough. Because he had a reserve-officers commission, he finally landed in a CCC camp after canvassing all the job possibilities. He did a lot of reading during the eighteen-month stretch in the camps and was impressed by some of the fine advertising the elevator people were doing. When he was discharged, he called on one of the leading elevator companies.

"Sure, there is a future for men like you in our business," he was told. "Start at the bottom—erecting."

Right there is where he bucked up against the union. He got on as an apprentice—87½c an hour, a 40-hour week, work subject to the call of the business agent. But here was the rub: 7c an hour had to be paid for dues; that was $2.80 per week when he worked a full week. And he did not work unless he had a little slip from the business agent showing that his dues were paid for the preceding week. That was all right for there was a lot of elevator business in the city.

Six months he worked as an apprentice. Then he was told that he would have to join the union as a full mechanic. So he talked with the business agent. They would take him in IF he would pay $300 initiation fee in advance. Where is a young fellow, only recently married, to get $300? That didn't bother the union. And the man who told him there was a future in the elevator business could not do anything about it either. He did not have a place on his staff at the moment.

"What did the boy do?" Electra asked.

"Went to selling electric refrigerators," I answered.

Then there was the young fellow who put in two years in mechanical engineering and had to leave school when his father suddenly died from the wear and tear that has taken a lot of comparatively young men since the depression. This chap joined the army in one of the mechanized sections. At the end of his first hitch, he was an expert mechanic—so good that he was promised two different jobs in one of our larger Pacific Coast cities. He could not take either of them because he did not belong to the union. He produced the $50 required initiation fee and offered to join. The business agent was sorry, there were too many automobile mechanics now.

"What did he do?" Electra inquired. "Sell refrigerators too?"

"What do you suppose? He went back into the army."

Electra says I'm not sympathetic to the idea of unions. I am: they have accomplished much good. They can accomplish more. But they won't do it so long as they are run as rackets.

CONTRAST the experiences of these young men with those of five members of the 1938 graduating class of the South Pasadena High School. In that community, Noel League, appliance dealer, selected five boys and started them on an intensive course of salesmanship and meeting the public. They are to have jobs on a salary and commission basis. Many communities are more than mindful of the education of their youth. They place tools in their hands with which to work, but they fail to provide the jobs where these tools can be employed. Perhaps this is a sign of an awakening community interest to discover and promote on a long time basis ways and means of enabling young people to earn a livelihood in their own community.

ELECTRA fails to see anything funny in the recent experience of the Man in the Office Down the Hall. He is one of a group of six regular commuters who catch the 7:50 every morning from one of the so-called "bedroom" communities close by the big city. And he has a reputation for being most unlucky. One of the regular pastimes of the group is matching for carfare, the M.I.T.O.D.T.H. being the most frequent loser. So often did he lose that one of the group who had been in the service during the World War dubbed him the "Disbursing Officer." Each morning he would be hailed with the greeting, "Here comes the disbursing officer."

Now another passenger on the train was a government operative in one of the many alphabetical divisions. He became suspicious. He reported to a superior that a fellow traveler was impersonating a government officer.

So unbeknownst to any of the innocent group, a corps of investigators was assigned to them. Their private lives were looked into; their business affiliations checked; how they spent their leisure was studied, and their past history reviewed. For more than a month they were shadowed and stalked.

Finally one of the government operatives broke down. He told them how they had become a problem of the WPA, how a corps of WPA workers had looked into their lives. Until they told him, the WPA was unaware of the joke, namely, that the only thing the M.I.T.O.D.T.H. disbursed was carfare.

"I wish we had back the money we spent on you birds and I wish I had back the sleep you made me lose in getting all the way over here from the city to catch the 7:50 train every morning," the government man complained.

Now the group is proud of itself. It is considering incorporating as PWA Project No. 1,177-XF-203, or whatever the number is that was assigned to them.

CKVA

By C. R. BENSON
Transformer and Capacitor Specialist,
General Electric Co., San Francisco

Capacitors. What they are, how they work, and where they may effectively be used. Simple rules for selection and application to both industrial and central station systems, based on today's practice, economics and equipment—First of two parts

WHAT are the reasons for the increasing interest of industrial and utility engineers in the application of capacitors? Factors leading to the use of this simple device in power work are purely economic. Properly applied, it will decrease the industrial plant's power costs on the one hand and will improve voltage regulation and release capacity for the utility on the other.

This comes about because in[duction] motors, transformers and other [induc]tion apparatus draw a line cur[rent] which is greater than the current which would be required to supply only the actual power consumed. This increase is due to the magnetizing [cur]rent which flows in the circuit [to] the magnetic fields of the inductive equ[ipment] build up and collapse with each cyc[le]. The magnetizing current reaches its [maxi]mum value a quarter cycle later than does the voltage wave and is thus said to lag the voltage by 90 deg.

On the other hand, capacitors draw a current which reaches its maximum a quarter cycle sooner than does the impressed a.c. voltage and is thus said to lead the voltage by 90 deg.

That is, capacitor current is 180 deg. out of phase (exactly opposite) to magnetizing current. Hence, when a load consisting of both inductive and capacitive equipment is connected to a line, the magnetizing current (between the capacitor and the generator) is reduced by an amount equal to the capacitor current.

Thus in Fig. 1a, if E is the direction of the voltage, I_p the current supplying power, and I_m the magnetizing current, then I_t is the [total] current, by graphic addition. If I_c [were] compared in magnitude to I_p it would [be] to B, and thus be AB greater than the [cur]rent needed to supply the power. Now if [capa]citors drawing current I_c, equal but [op]posite to I_m, were added, I_m and I_c would [bal]ance out, and total line current would [coin]cide with I_p in both direction and magnitude.

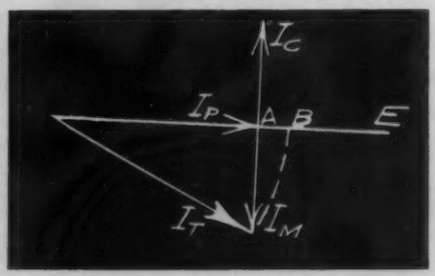
The current supplying power multiplied by the voltage is the true power, kw. The line current multiplied by the voltage is called the apparent power, kva. The ratio of the true power to the apparent power (kw./kva.) is equal to the power factor of the circuit. The advantage to the central station of unity power [factor] lies in the reduced current [and] the [lessen] amount of power [con]sumption.

Although the principles and rules applying to the use of capacitors are well established, frequent inquiry has indicated to Electrical West an acute need for complete, specific information on capacitors assembled in one place. Herewith is published the first half of [an] article by Mr. Benson which co[vers] the entire field. Part I includes: [the] principles, developme[nt] and [appli]cation of capacitor [equip]ment, [and] part of the ma[teri]al on [cen]tral station application.

The [second] part [next] month will include [consi]derations in central statio[n] [use] of capacitors, miscellaneous [indus]trial application. Supple[mentary] will be examples of succe[ssful] installations, both central station [and] industrial.—Ed.

Many utilities find then[selves] such that [the] power factor clau[se] in rate sch[edu]les is to the individual [cus]tomer's [dis]advantage—such clauses offering a [pe]nalty or bonus depending on the [pow]er factor or the kva. demand. In [such] cases it is advantageous for the [in]dustrial at least to consider power [fac]tor improvement. Some industrials [can] improve their power factor by re-

Fig. 1a—Line current reduced by addition of capacitor



arranging motor circuits, substitution of smaller motors or use of synchronous motors. Others find that to improve their power factor materially static condensers or capacitors are required.

The demand for capacitors for industrial application gave an impetus to their development. Not only were high capacities required, but long life and an economical cost were essential.

During the last few years central stations have found conditions on their lines changing. The increased use of small motors for household devices, air conditioning of homes and offices has decreased the power factor of their feeders as the load has built up. The small motors used on these devices generally have a rather poor power factor which means that the current required is high in comparison to the actual kw. load. This has resulted in [a] voltage drop on many feeders [and] loss of feeder capacity. As will be shown, capacitors in many cases offer [an] ideal solution to these troubles.

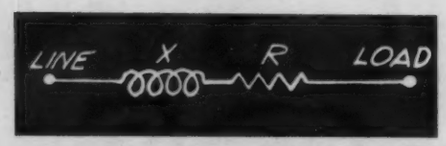
The demand for 2,300-volt and higher capacitors for industrial and central station application decided the question [as] to type of impregnating materials [to] be used, impregnating because of the considerably higher long time dielectric strength of oil treated paper as against wax or other treating materials.

Since we are mainly interested in capacitors for power factor correction, the following applies primarily to this type of unit.

Dielectrics

The dielectric used in capacitors for power factor correction is generally composed of the required number of layers of thin paper, impregnated with a liquid of requisite characteristics. This liquid may be a refined mineral oil or a synthetic chlorinated diphenyl, now used by several manufacturers.

The advance in capacitor reliability made in the last 20 years has in part been due to improvements in the qual-



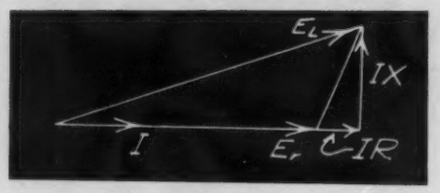
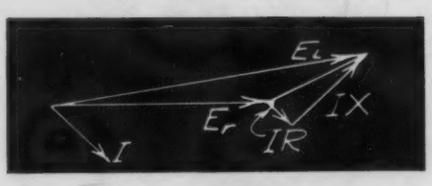


Fig. 1—(top) Line with high ratio of reactance to resistance. Fig. 2—Conditions with unity power factor load.. Fig. 3 (below) Load at 70% p.f.



ity of paper used. The dielectric qualities of the paper depends largely on the purity and density. To give the high degree of safety factor and long dependable life demanded of a capacitor requires paper which meets most rigid specifications involving its physical, chemical and electrical characteristics.

Chlorinated diphenyl or Pyranol as it is known by the General Electric Co., came about as a result of research efforts to improve oil characteristics. In industrial applications the greatest benefits are secured by placing the corrective equipment or capacitors as close to the load as possible. Capacitors should be designed so that they can be installed with safety in confined spaces. Pyranol, being a non-inflammable, non-explosive liquid, permits the capacitors to be installed in any location with no risk of fire.

Kva. Rating

In power work, whether for the industrial or utility, we are interested in kva. of corrective equipment as expressed in the following equation:

$$KVA = \frac{E^2 2\pi f C}{10^{\ldots}}$$

where E = voltage
f = frequency
C = capacitance in microfarads

From this it is interesting to note that for a given value of C the kva. is proportional to the square of the voltage.

Good design dictates the minimum number of layers of paper that may be used. Present paper thicknesses determine the minimum insulation that may be used. These design requirements increase the insulation requirements on 230 volts over what would be satisfactory from a stress standpoint. For this reason the 230-volt unit is not as economical to manufacture at present as the higher voltage units.

Manufacturing methods determine the most economical size of an individual unit. At present this is 5 kva. for 230 volts and 15 kva. for 460 volts and above.

Central Station Application of Capacitors

Although many of the benefits of capacitors received by the central station and industrial are the same, the primary reasons for their use are not. Industrials primarily install capacitors to obtain the benefit of a lower power cost. The central stations, as pointed out previously, found the power factors of their feeders decreasing at a faster rate than their load grew. Some central stations found their generating capacity inadequate, others found their transformers, regulators and feeders overloaded. Still others found their feeder capacities limited by the allowable voltage drop and voltage regulation to the consumer.

Additional generating, substation and feeder capacity not only costs money, but takes time to purchase and install, especially in the case of generating equipment.

The attention of engineers was called to capacitors and their studies showed the economies of using capacitors to correct many of these difficulties.

It was found: (1) Generator, substation and feeder capacity could be released. (2) Voltage drops on feeders could be reduced. (3) System losses decreased. (4) Major investments could be deferred. (5) Revenue could be increased. (6) Increased regulator capacity and operating range could be obtained.

All these advantages can be realized economically due to improvements in capacitor design and reduced costs over the past few years.

Whereas the industrial thinks in terms of power factor, central stations should think not only of power factor, but in terms of the amount of reactive current. The amount of reactive current is of prime importance because of the phase relation of the voltage drop due to the reactive current. This is especially true on feeders where the ratio of reactance to resistance is high.

Just what there is about reactive current that causes this condition is revealed by a study of the characteristics of a 4/0 stranded copper feeder with equivalent spacing of 48 in. The resistance per 1,000 ft. is 0.0515 ohms and the reactance 0.127 ohms (Fig. 1).

At unity power factor load a vector diagram of the conditions would be as shown in Fig. 2.

It can be seen (Fig. 2) that the difference between E_r and E_L is approximately the IR drop. With a load of 400 amp. this would be about 20 volts.

With the same ampere load at 70 per cent P.F., a vector diagram of the conditions would be as shown in Fig. 3.

From Fig. 3 it can be seen that the IX component plays the most important part in determining the difference between E_r and E_L or the voltage drop. The value of this drop is approximately 50 volts or 150 per cent greater than the same current at unity power factor shown in Fig. 2.

These two examples serve only to show the effect of power factor on feeder regulation. It is interesting to note that even at 98 per cent power factor the drop is approximately 30 volts or 50 per cent greater than at unity power factor.

At 70 per cent power factor in addition to 150 per cent increase in voltage drop, the actual kw. load being carried is only 70 per cent of the original value for the same kva.

What a capacitor does when installed on the same feeder is revealed in Figs. 4 and 5.

A capacitor then causes a voltage rise along a feeder depending almost entirely on the reactance of the feeder.

Combining Figs. 3 and 5, we get the result shown in Fig. 6.

Fig. 6 is the unity power factor condition, since the value of the capacitor was chosen equal to the rkva. Now the feeder amperes have been cut from 400 to 283 and the voltage drop from 50 volts to 15 volts. Losses have been reduced directly proportional to the square of the currents $(283/400)^2$ or to 50 per cent of their original value.

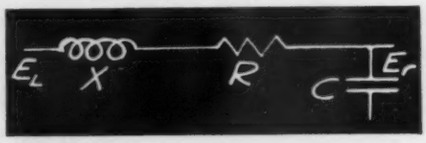
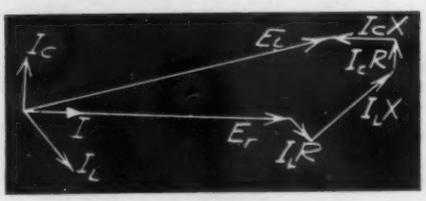


Fig. 4—(top) Line of Fig. 1, with capacitor installed. Fig. 5—Effect of capacitor at no load. Fig. 6—(below) Figs. 3 and 5 combined



The feeder can now carry additional load sufficient to bring the current back to 400 amp.

Since, as may be seen from Fig. 5, the approximate voltage rise due to the capacitor is dependent on the size of the capacitor and reactance of the line, it may be expressed as a percentage rise:

$$\% \text{ Voltage Rise} = \frac{\overline{CKVA} \times D}{10\,\overline{KV}^2} \quad (1)$$

$\overline{CKVA}$ = 3-phase capacitor kva.
X = reactance in ohms per mile.
D = length of line in miles.
$\overline{KV}$ = line kilovolts.

The per cent voltage drop due to the load must take into account the power factor from Figs. 2 and 3. This expression is:

$$\% \text{ Voltage Drop} = \frac{\overline{KVA} \times D \times (R \cos \phi + X}{10\,\overline{KV}^2}$$

KVA = load kva., 3 phase.
D = length of line in miles.
R = resistance in oh[illegible]er mile.
X = reactance in o[illegible]ile.
KV = line kv.
Ø = uncorrected power fac[illegible]

The increase in feeder kw. carry capacity released by a capacitor is:

$$\Delta KW = \frac{\overline{CKVA}}{\tan \phi + \left(\frac{R}{X}\right)} \quad (3)$$

Δ KW = increase in feeder capacity released by the capacitor.

9—EL WEST swa

$\overline{CKVA}$ = 3 phase capacitor kva.
Ø = uncorrected power factor angle.
R = total resistance from substation to capacitor.
X = total reactance from substation to capacitor.

The losses on a capacitor before an[illegible] after correction are an important ite[illegible]

$$\% \text{ of Original Losses} = \left[\frac{(\cos\phi)^2}{(\cos\phi_1)^2}\right] 1[illegible] \quad (4)$$

Ø = power factor before [illegible]ection.
Ø¹ = power factor after co[illegible]ion.

The original losses in kw.-hr. on a feeder may be estimated fairly closely. Having chosen a representative 24 hour feeder current curve determine the r.m.s. value of current (i.e., the square root of the average square values). This average r.m.s. value squared, times the resistance to the load center times 8,760 (hr. in a year) give the total kw.-hr. loss per phase.

The annual reduction in feeder copper losses due to the application of capacitors may be approximated from the formula:

Yearly Kw.-hr. loss reduction =

$$\frac{R_L\,\overline{CKVA}\,(2\,\overline{KVA}\sin\phi - \overline{CKVA})\,8760}{1000\,\overline{KV}^2} \quad (5)$$

R_L = resistance to load center in ohms.
CKVA = 3 phase capacitor kva.
Ø = uncorrected power factor angle.
KVA = uncorrected 3 phase load in kilovolt amperes (24 hour r.m.s. value).
KV = line kilovolts.

Determination of Required Capacitor Kva.

To obtain the maximum operat[illegible] and economic benefits, the power f[illegible]r should be corrected to unity.

Since capacitors are usuall[illegible] connected permanently to the line[illegible]s not [illegible]ible to correct to unity po[illegible] factor [illegible] of the day. The re[illegible]ive kva. va[illegible] the day fr[illegible] light to peak [illegible]best com[illegible]mise is to correct for [illegible]e r[illegible]tive load on a representative

This average rkva[illegible] obtained by plotting the rkva. pe[illegible] the [illegible]resentative day and esti[illegible] value. This value dete[illegible] [illegible] of capacitors to add to th[illegible] feeder[illegible]ibution of this capacitor kva. de[illegible]e loading and the number of l[illegible] feeder. Generally the c[illegible]citor[illegible]d be distributed a[illegible]t as the lo[illegible]tion. They sh[illegible] be located as [illegible] the line[illegible]s possible, but never [illegible] out th[illegible] the capacitor current exce[illegible] the l[illegible] current by any large amount.

Central Station Capacitors

[illegible]apacitors for central station appli[illegible]on are available in the voltage [illegible]tings shown in Table I.

Table I—Capacitor Voltage Ratings

Standard Capacitor Voltage Rating	Range of Circuit Voltages	Maximum Permissible Working Voltage
230	230 to 240	264
460	460 to 480	528
575	575 to 600	660
2,300	2,300 to 2,400	2,640
4,000	4,000 to 4,150	4,565
4,600	4,600 to 4,800	5,280
6,900	6,900 to 7,200	7,920
7,620	7,620 to 7,950	8,745
11,950	11,950 to 12,470	13,720
13,200	13,200 to 13,800	15,150

Capacitor equipments are available for 2,300-, 4,000- and 4,600-volt circuits. These units are generally made up of the required number of individual 10- or 15-kva. single phase units housed in a metal container, the metal housing being provided with means for pole mounting and suitable bushings for the line connections (Fig. 7).

To make possible more effective distribution of the corrective kva. in small blocks and at more points over the entire feeder there has been developed an individual pole-type unit. These units are available in sizes 10 and 15 kva. for 2,300- and 4,000-volt circuits and 15 kva. for circuits from 4,600 volts through 13,200 volts.

These individual units are suitable for outdoor installation. They are compact a[illegible]readily installed with either cross-a[illegible]mounting or direct bolting to th[illegible]pole. Standardization amongst ma[illegible]acturers on mounting dimensions pe[illegible]its interchangeability of mountings a[illegible] units.

For single phase installations a single [illegible]nit hanger is available for pole or cross-arm mounting (Fig. 8). For larger group installations a 4-unit rack is used. A 180-kva. installation consists of three racks. Each rack containing four- 15-kva. units or 60 kva. connected across one phase. (Fig. 9). The four unit rack can also be used for three single phase units connected in a 3-phase group to give a bank of 45 kva.

Dischargers

When disconnected from a line, capacitors will retain their charge unless some provision is made to discharge the units. All equipments are provided with some means of discharging. Group equipments are provided [illegible]h discharge reactance coils and in[illegible]l units have a built in discharge [illegible]ble of draining the residual charg[illegible]lts or less in five minutes. In [illegible] case the losses of the discharge equipment are small and are generally included in the loss guarantees on the capacitors.

Delta or Grounded Y Circuits

[illegible]dual outdoor units are availabl[illegible]h two bushings for delta or ungrounded Y circuits, the units connected line to line. Single bushing units are available for solidly grounded common neutral circuits, connected line to neutral. The single bushing design being slightly lower in price because of the bushing saving.

Allowable Kva.

NEMA standards require that "standard capacitors shall be satisfactory for operation at 135 per cent of rated kva. This maximum kva. shall include (a) kva. due to excess voltage at fundamental frequency and (b) kva. due to harmonic voltages superimposed on the fundamental frequency. This latter adds directly to the kva. at the fundamental frequency."

Capacitor Costs

From an economic standpoint the best application of capacitors is on 2,300-volt delta and 4,000-volt Y circuits because the unit cost is the lowest and the benefits are the greatest.

Individual 2,300- or 4,000-volt capacitors cost approximately $6.50 per kva. The installation costs are, of course, variable, but a fair figure would be $0.50 to $1.00 per kva., this cost to cover hangers, cutouts, extra hardware and labor. Average individual capacitor unit costs are approximately as follows for higher voltages:

4,600	delta	$ 8 per kva.
6,900	delta	8 per kva.
7,620	delta	8 per kva.
11,950	Y	11 per kva.
13,200	Y	11 per kva.

Economic Benefits

A—Increased Feeder Capacity—It is difficult to give any exact figures as to actual dollars and cents value of the addition of capacitors to a feeder. Every feeder represents a study in itself. A little study will quickly show what can be expected knowing the feeder conditions.

For example, assume a [illegible] 4,000-volt Y 4/0-feeder 1½ miles long is carrying 1,500 kva. at 80 per cent P.F., equivalent spacing 59 in.

The voltage drop at 1,500 kva. is 8.24 per cent approximately. Let this represent the maximum [illegible] drop in this section of the feeder. If 400 kva. of capacitors are added to the end of this feeder the additional kw. which the feeder will carry can be calculated from (3) above.

$$\Delta KW = \frac{400}{.75 + \left(\frac{.272 \times 1.5}{.696 \times 1.5}\right)} = 350$$

This 350 kw. is equivalent to 437 kva. at 80 per cent P.F. This additional 437 kva. is obtained with an investment of approximately $3,000 (400 x $7.50). On a conservative basis the increased capacity is worth $25 per kva. This is worth annually (at 12½% carrying charge).

$$\$25 \times 0.125 \times 437 = \$1,365$$

The annual cost on the capacitors (at 12½ per cent) would be $375 or a saving of $990 by installing capacitors.

As an estimating average, one kva. of capacitor will release 0.8 kw. of feeder capacity on circuits of 1/0 copper and larger with P.F. from 80 to 85 per cent.

B—Increase regulator capacity and improve regulation.—As another example, assume a uniformly loaded feeder has a voltage drop of 15 per cent from the first to the last customer. This might be a 4/0-feeder, 1½ miles long, together with a 2/0-feeder 2 miles long. An induction regulator having a 10 per cent range would only partially correct the trouble. Customers close in to the regulator would receive too high a voltage and the customers on the end of the line too low a voltage.

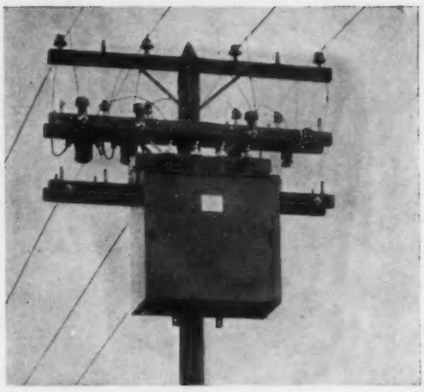


Fig. 7—Unit for pole mounting made up of [illegible] individual single-phase capacitors housed in [illegible] metal container

Fig. 8—(below) Single-unit hanger, available for pole or cross-arm mounting of single-phase units

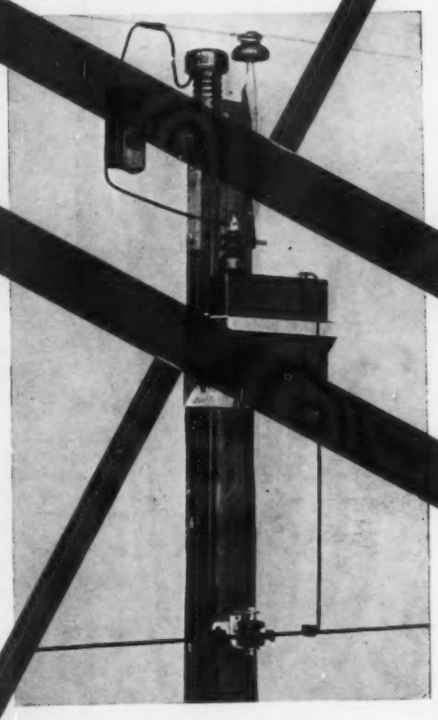
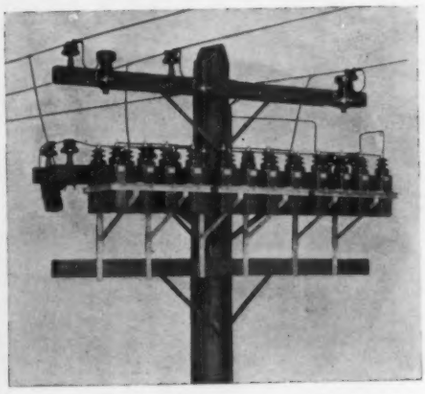


Fig. 9—(below) Group installation consisting of three racks totalling 180 kva. Each rack contains four 15-kva. units



Theoretically capacitors should be distributed approximately as the reactive kva. load. This would require the installation of a large number of small units. Practically this is not necessary and generally capacitors are lumped in banks of 45, 90, 135 or 180 kva.

For the line under consideration let us assume that the average reactive kva. is 550. Therefore, three banks of 180 kva. or 540 kva. would probably be used, one at the end of the 4/0 section and the other two at the middle and end of the 2/0 section.

The percentage voltage rise in the 1½ miles of 4/0 section is computed as follows:

$$\% \text{ Voltage Rise} = \frac{\overline{CKVA} \times D}{10\,\overline{KV}^2} = \frac{540(.696)(1.5)}{10(4)^2} = 3.52 \text{ per cent}$$

The percentage voltage rise in the first half of the 2/0 line is 1.63 per cent and for the last half of the 2/0 line, 0.81 per cent. This gives a total rise to the end of the line of 5.96 per cent. Although the regulator has a boost range of 10 per cent, only 5 per cent is now required. The first customer would now receive approximately 5 per cent overvoltage, while the last customer receives approximately 4 per cent undervoltage at time of peak load.

At light load due to the voltage rise of the capacitors, the regulator would be used in the buck position. The feeder under consideration would have about 3 per cent drop at light load. To give 3 per cent overvoltage to the last customer the regulator would be at the 3 per cent buck position. This would give a range of regulation of plus or minus 4 per cent on the first customer and 3½ per cent plus or minus on the last customer as against 10 per cent plus on the first and 5 per cent minus on the last customer without capacitors.

Total cost of the capacitors would be approximately $3,500. Any other method of providing suitable regulation such as increased copper or a new feeder and associated equipment would cost from 2½ to 5 times this. Also in addition to improved regulation on the feeder a 5 per cent range of the regulator is required as against 10 per cent without capacitors.

For estimating on a 4-kv. feeder, the voltage rise per mile of line per 100 kva. of capacitor is 0.4 per cent on a 2,300-volt feeder the average voltage rise per 100 kva. of capacitor per mile of line is approximately 1¼ per cent.

C—Increase in Substation Capacity—Assume a 6,000-kva. bank of trans-

formers in a sub-station as carrying a peak load of 6,000 kva. at 80 per cent P.F. To improve the power factor from 80 per cent to 98 per cent the capacitor kva. required may be found from the following:

$$CKVA = KVA \cos\phi\,(\tan\phi - \tan\phi_1) \qquad (6)$$

CKVA = capacitor kva., 3 phase.
KVA = circuit kva. at peak load.
ϕ = uncorrected power factor angle at peak load.
ϕ_1 = corrected power factor angle.

The kva. load on the feeder may then be found from:

$$\overline{KVA_c} = \frac{\cos\phi}{\cos\phi_1}\,\overline{(KVA)} \qquad (7)$$

$\overline{KVA_c}$ = corrected peak circuit kva.
ϕ = uncorrected p.f. angle.
ϕ_1 = corrected p.f. angle.
$\overline{KVA}$ = circuit kva. at peak load.

From (6) above the capacitor required to increase the power factor from 80 to 98 per cent is 2,640 kva. From (7) the corrected peak kva. is 4,900.

That is, the addition of 2,640 kva. of capacitors has decreased the load on the substation 1,100 kva. At the original power factor somewhat greater kva. than 1,100 can be added without exceeding the original kva. on the substation. For estimating purposes, we can assume that the additional kva. which can be put on the substation is at least equal to the above value or 1,100.

Substation capacity is generally valued at $15 per kva., resulting in a saving of $16,000. Figuring carrying charges at 12½ per cent, the annual saving would be $2,000.

For estimating purposes 1 kva. of capacitor will release 0.4 kva. of substation capacity.

This benefit is extended not only to the substation, but to the generating and transmission equipment. A kw. of generating capacity may be valued at $175. It can be obtained by investing $19 or less in 4-kv. capacitors.

Reduction in Energy Losses

To estimate feeder losses it is necessary to refer to a representative 24-hour kva. demand curve. From this curve a 24 hour r.m.s. value of kva. may be determined. For approximation this value may be found by adding 60 per cent of the difference between minimum and maximum kva. to the minimum kva.

The reduction in annual kilowatt-hour feeder copper losses may then be calculated from (5). The value obtained times the valuation of 1 kw.-hr. of copper loss will give the total estimated yearly savings.

(To be concluded next month)

RUSKIN station of the British Columbia Electric Railway Co. soon will have its capacity doubled. Stator frame and windings are now in place for the 44,000-kva. No. 2 unit. Dimensions of the unit can be judged from the four men who are looking into the generator pit, inspecting turbine shaft coupling and inlet ventilating ducts. Canadian Westinghouse is installing the generator

Not Plotted

You yourself, or another fellow in your plant or crew or office, probably have a better tale to tell than this. If it's something that really happened, and if it treads on no one's toes, send it to ELECTRICAL WEST. That's what this "Not Plotted" column's for.

"Scratch a tenor and you'll get a love song." But scratch an engineer and there's no telling what you'll get.

Scratch Henry L. Senger, chief engineer of Idaho Power, and you're in for a surprise. Just off the press is his latest work, a book, "Saga of the Sawtooths."

For those who've not met him, the author is a tall, lean, white-haired gentleman, with a twinkle in his eye and a face rather narrow than wide, which, once seen, is remembered forever. A great part of Mr. Senger's career has been spent building electric facilities in Idaho. Rumor has it that in that territory wire-cutters, pliers and similar tools are unknown. Idaho has no use for men who can't handle with their bare hands any conductor manufactured to date.

But whether that rumor's true or not, it's known that Idaho is a very tough country, and "Saga of the Sawtooths" is a serious endeavor to chronicle the characteristics and habits of its endemic animals.

Traversing a part of Idaho are the rugged Sawtooth mountains. It is to this region that Mr. Senger has confined his research. Collaborating in the publication is a competent artist, and on the pages of the Saga are to be found splendid drawings of the animals treated in the work.

There is, for example, the mugwump. This customer, Mr. Senger tells us, frequents the most sawtoothy of the Sawtooths, where he is to be found straddling a peak, mug on one side, wump on the other. He invariably faces east and west.

The high-behind is adequately described by his name and is built that way so that he will encounter no difficulty in feeding from the steep slopes, or in drinking from the fast-falling streams without getting water in his nose.

More mobile is the side-hill badger. Evolution has favored the s.h. badger with legs on one side much longer than those on the other, thus equipping him to maneuver with ease along a given contour line.

"Only recently," Mr. Senger reports, "I journeyed into the Sawtooths for the sole purpose of experimenting with the mugwump. I turned him so he faced north and south."

Why, when he was in a turning mood, the author picked on the mugwump is a mystery. Unless, as some believe, he felt the results of reversing a high-behind or a s.h.badger would be too fearful for words.

The author carries his subject nicely and displays unusual versatility, treating his material in both prose and verse. You'll enjoy "Saga of the Sawtooths". It's recreational reading for engineers.

$2,440 Cheaper, 2,000 lb. Lighter

Discarding conventional use of materials leads to 35-percent reduction in line truck body weight and saves dollars

NEEDLESS weight represents needless expense, but when vehicle taxes impose an extra penalty for weight, there is extra incentive to hold line truck body weights to minimum.

With such incentive, Northwestern Electric Co. has achieved a real step forward in utility automotive equipment. In addition, so successfully did Fred S. Beach Sr., designing engineer for Northwestern, apply principles heretofore scarcely used except in airplane and light-weight train construction that his design was a winner in the James F. Lincoln Arc Welding Foundation competition.

Alloy Employed

In general, weight saving was achieved by using Cor-Ten steel (a product of U. S. Steel Corp.) by discarding the use of conventional structural shapes, by resorting to welding, and by designing the body "skin" to function as a structural member where possible.

The new unit, of which two have been built, replaces one developed in 1928, saving $2,440 in cost and 2,000 lb. in weight. The old truck weighed 11,000 lb. empty, had 2-ton nominal capacity, was rated to load to 13,500 lb. gross. The new truck weighs 9,000 lb., rates 2- to 3-ton nominal, loads to 15,000 lb. gross.

The two units have been developed on similar chasses, one a DS40 International Harvester Co., one a GMC. As in the building of an airplane, no piece of equipment, even one so small as a door latch, was selected until it was proved to justify itself on a weight basis.

No Independent Frame

Mr. Beach found one source of redundant weight in truck bodies to grow out of the practice of using longitudinal sills resting on the chassis frame to form an independent body frame. In his design, bins and bodystake structures themselves are longitudinal strength members while body cross-members rest directly on the chassis frame.

Sheet Cor-Ten was the structural material, Nos. 10, 12, 14, 16 and 18 being used to form up structural members (used instead of conventional shapes), and sheets ranging from Nos. 18 to 24-gage were employed for bin and curtain walls and other flat-surface members.

Ramsey Machinery Co., Portland, cooperated with Mr. Beach to produce a lighter winch, weight saving again being effected through fabricating the winch frame from No. 12 gage Cor-Ten and arc-welding parts.

Coontrolled from the driver's cab, the winch mechanism operates through a 4-1-ratio sun an planet gear system. Keyed to the drum shaft is the sun pinion, while planet pinions are mounted on studs, which in turn are carried on a brake disc which rotates freely when the drum is disengaged. Second mesh of the planets is with an internal gear, mounted on the inside of the brake flange of the drum. Applying the band brake stops the idler disc and causes the planets and drum internal gear to turn the winch drum. Also controllable by the driver is a pawl, working on a ratchet, which permits holding loads suspended.

Occupying body width and 37 in. of length is the cab space, with seating capacity of four or five men. Three more are accommodated in the driver's cab. Safety feature of the body car is provision of a door on both right and left sides.

Seat and lazy-back cushions in the body cab are removable for access to the winch drum, located below. Ten material and tool bins with top-hinged, high-strength aluminum doors (12-gage, 17ST) occupy the side space behind the cab. Shallow drawers extending across the body and removable from either side provide space for hand saws, rock-drill bits, etc. These are 2½ in. deep with plywood bottoms.

Structural Components

Above the bins, outside and inside rows of body stakes form spaces for crossarms and digging tools. A single sheet forms the roof for this space and extends upward to the tops of the inner stakes. Rails along the stake tops join the system rigidly with the roof. The bin and inside stake structures give the body its longitudinal rigidity. Cross-members are cantilevers with the longitudinal side structures carried on their ends.

Continuous-bead arc welds join principal structural elements while brackets join body and chassis. Where bolt holes were necessary in chassis-frame sills, they were drilled through the neutral axis of the sill cross-section.

Weights of principal components are:

Body	1,985 lb.
Coupler	48 lb.
Stiff legs	48 lb.
Snatch-block eye bolt	16 lb.
Derrick and guying	510 lb.
Canvas, spot lights, etc.	200 lb.
	2,780 lb.

The pole derrick is a simple gin pole of yellow fir which cost less than $75 and can be made ready for pole setting by two men in less than 2 min.

In regards to cost, it might be pointed out that if 10 years is assumed to be the useful life of the unit, and 6 per cent the interest rate, a $1,400 saving would be grossed from this standpoint alone.

Highly satisfactory performance, plus lightweight and low cost, has led Northwestern to the conclusion that its venture in modern body design has been fully justified.

First solid carload of ranges to be shipped to Salem, Ore. From left to right: W. H. Rush, Douglas R. Yeater and Clarence Weaver, range supervisor for Westinghouse

Carload

How a new appliance store sold a full car of ranges in 90 days

By HENRY W. YOUNG

In May of this year, a carload of electric ranges was received by a Salem, Ore., appliance dealer. It was said to be the first full car of ranges ever to be delivered there. In less than 90 days, however, they were all sold. This accomplishment in a city of 28,000 population and a retail trading area of about 40,000, pretty thoroughly combed by ten other dealers, would be noticed almost anywhere. That the dealer, Yeater & Rush, had been in business only since Feb. 1 makes the feat all the more amazing.

Douglas R. Yeater and W. R. Rush are the two young men running the store. While the venture is new, both of them are seasoned in appliance selling. Yeater had been for a number of years rural territory salesman for the Portland General Electric Co. Rush had been with the same company selling in the City of Salem. Both were schooled in the broad planning and observance of the smallest details which a large utility employs in merchandising.

"Rather nervy of you fellows to start a strictly appliance store here," I ventured. "About every furniture, hardware and department store in this city seems to be in the electrical appliance business. They can handle appliances as a side-line and use them simply as leaders if they wish. That makes stiff competition. How do you meet it?"

"Our plan," and Yeater smiled, "might be termed refraining from a plan. It consists in trying hard not to do those things which, our experience in observing the operations of a great many dealers shows, seem to work to the disadvantage of the business in frequent cases. Two of these may be emphasized. First we, personally, are having as little to do as possible with running residential sales crews, lest in the end the crews run us. Second, neither of us spends a minute running the floor-end of this store when we can possibly avoid it. Again, lest the store wind up by running us.

"As we look at it," he continued, "a strictly appliance business in a field of this size cannot support a high-paid boss or proprietor inside, much less two of them. Since both of us have always sold on the outside and enjoy it most, we continue to do the bulk of the outside sales work ourselves. The store we have put into the hands of a thoroughly experienced woman, who had been for six years with the same utility we came from. She can handle floor sales and is also a competent demonstrator. What is even more valuable, she is alive to every sales opportunity arising on the floor which may require following in the home. Both of us are kept busy on leads from the store and from present customers.

"To say that we are not believers in special house-to-house selling crews needs some qualification. We do use such crews, but not on a permanent basis. The reason is that to run a permanent crew requires a lot of time on the part of the owners—organizing, planning campaigns, instructing salesmen, keeping up enthusiasm and finally going out and helping salesmen close. The last, especially, means duplication of effort, and the business can't stand duplication.

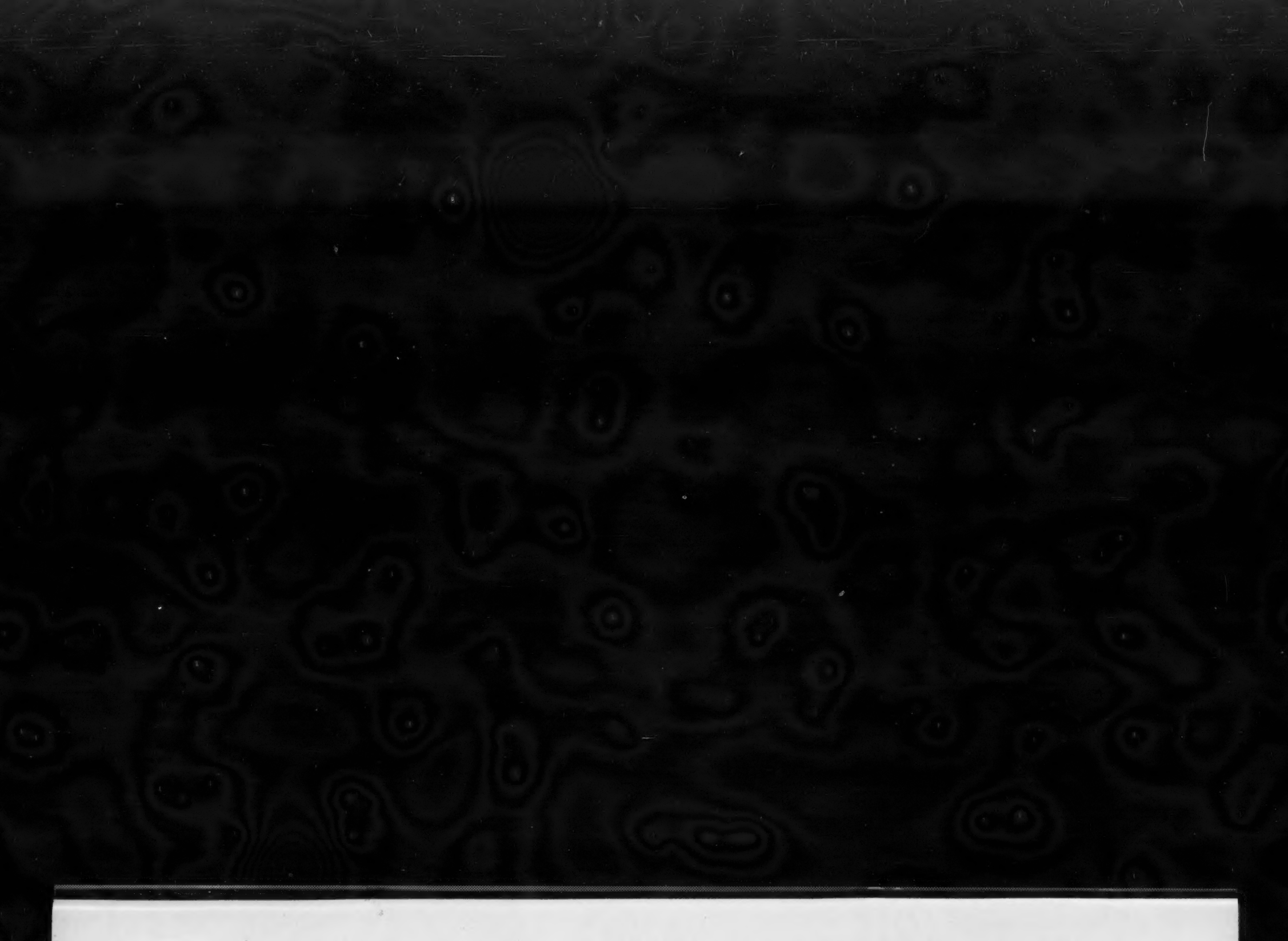
"When we do use a crew, as in a recent washing-machine campaign, we select one competent man and put him in charge. He then selects his own salesmen, instructs them and supervises them. We don't mix in it except to see that the methods employed are ethical and not detrimental to our business.

"At the present time we are getting ready to start a special lighting campaign on IES lamps, using boys from a small, local university. We will locate a student with some sales experience and put him in charge. He will organize his boys and supervise their work. Right after school starts, and to the end of the lighting season, they will work part-time afternoons and evenings going out and setting a given number of lamps in as many homes. Later, they will go back and close sales under the instructions of their supervisor. Again, we will devote little or none of our personal time to the campaign after it is started."

According to the owners, they set their first years' quota at $40,000 gross. The first six months they did somewhat more than half of that—and at a profit—largely through this type of personalized selling. "What about that solid carload of ranges?" I said. "You must have employed a special crew there, to move them in 90 days?"

"It happens that we didn't," Yeater

One side of the new store of Yeater & Rush. It is a former bank quarters, redecorated and made into an elaborate show-room for electrical appliances. "A fine looking place, but one we stay out of as much as possible," the owners explain



ELECTRICAL WEST
Appliance Sales Guide
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Harvest Your Lighting Crop

Why it is good business to sell the recommended engineered job

A TRAINED sales force, yours for the asking! In effect this is available to you. The cost—only a little cooperation that will return you business and profit. Every utility, for its own business interests to be sure, is developing new commercial lighting prospects and customers. To do so it has trained its men, equipped them with demonstration tools and data, sent them forth on a systematic combing of its commercial and industrial customers, and is constantly creating and developing lighting business—modernization, new applications, better jobs. Invariably this business is sold through a contractor or dealer.

The only thing it expects in return is that the contractor be smart enough to back it up in its lighting recommendations, sell the job *up* instead of down, and put it in according to the best standards of wiring. A sales force at your command, and at no overhead cost to you!

Why It Pays You

Here are the reasons it pays you to take full advantage of this lighting sales service:

1. Every contractor is a busy man. You have many departments of work to supervise and operate—estimating, buying, labor hiring and directing, getting materials to the job, keeping accounts, collecting bills, paying the suppliers, attending to association and civic duties. You have little time left to sell. The lighting staff of the utility are a sort of voluntary sales crew if you "play ball" with it.

2. The lighting specialist has taken courses, perhaps gone to the lighting schools of the lamp companies, studied all the kinds and methods of lighting. He has to keep up-to-date on this material. You get the benefit of his intensive training without cost to you.

3. He has the demonstration and testing equipment at his command. He is making demonstrations, giving lectures, talking to schools and public officials, promoting the idea of Better Light—Better Sight. He removes the resistance to cost by selling the benefits of good lighting.

4. New fields of application are being opened up every day. These need cultivation. The lighting specialist's job is to keep abreast of these. Work with him and the business he develops will come your way.

Other Allies

The wholesaler and the manufacturer of lighting equipment also have men in the field actively creating business. Naturally they have their own lines of products to sell, but by working closely with them you can often overcome price disadvantages by proving the worth of a good job at your right price. Real profit from the lighting job will come from selling up to the quality installation, not by chiseling down to an inferior and unsatisfactory job that just "gets by."

Boiled down to its simplest, most practical form, you will find the *advantage* story you should use to justify your quality installation price, on the other pages of this Sales Guide. It has been condensed from the mass of material also made available to you by the lamp manufacturers, the lighting equipment makers, the Illuminating Engineering Society, Better Light—Better Sight Bureau, and similar organizations. If you have time for nothing else, this basic *advantage* list will fortify you and prepare you to meet any type of sales resistance.

Stick to the advantages and the price will take care of itself.

Minimum Equipment

Relying on the utility lighting specialist you can cut your own overhead investment in instruments and equipment, but there are some tools you will find just as useful as a pair of pliers and screwdriver. With them you can make your prospect see with his own eyes that he needs what you recommend. These tools are:

1. *Sightmeter*—any one of several makes and models. This is the thermometer of light, the yardstick. It tells your prospect his need for light.

2. *Voltmeter*—to tell him the condition of the voltage on his circuits and show him the need for adequate carrying capacity. Voltage drop cheats him.

These are the "pliers and screwdriver" of your kit. Add others as you can afford them, each to tell the customer a convincing fact about his need for light.

October 1938
Commercial Lighting

. . . When the

Avoid the Technical

Remember **sales appeals** are not technical. They are appeals to some human need or business advantage. Deep down, such are the **real** reasons why the customer will finally spend his money for better light. By itself, light may not mean anything at all; perhaps he actually wishes he could do without. It is by bringing him to realize the need he has for **what light will do for him,** that he will move toward satisfying that need, light for selling, light for seeing, light for production. Any resistances he raises against his real wants and needs can only be overcome by piling up against these resistances the reasons, the **advantages** of his having a good lighting installation. The installation itself he may look upon as a necessary evil. To him it is apt to be a means to an end.

Here is a list of the advantages, the benefits that a well designed lighting installation can deliver. In selling a lighting job, or in keeping sold the recommended job against chiseling, use these appeals. On the opposite page you will find examples of how these appeals are balanced against the most common resistances, and a way suggested to ask for the order in a natural yet action-stimulating way. As new resistances are brought up, meet them with more advantages, and keep on asking for the order.

Better General Lighting

1 **Presents the merchandise** more attractively. Shows it to best advantage. Brings out color, quality, and pattern.

2 **Makes seeing and examination easy** for the customer; makes it easier to buy. Invites purchase because it enhances the appearance of the merchandise.

3 **Increases sales** by capitalizing on the impulse to buy. Speeds up selling and reduces selling cost.

4 **Keeps sales people alert.** Eliminates eye strain and fatigue.

5 **Improves the atmosphere** of the store or office. Creates a cheerfulness that invites patronage, promotes courtesy, pride in working there.

6 **Reduces mistakes** in accounts; in selection of merchandise, and hence the amount of returned merchandise.

7 **Looks up-to-date and modern,** successful, progressive. Is a standing advertisement.

8 **Easier to keep the place clean**—promotes cleanliness on the part of the employees; makes a sanitary place in which to work or do business.

Better Window Lighting

1. **Increases the number** who see the merchandise as they pass; stops more of them to look; brings more of them into the store.
2. **Makes good first impressions.** Gives character to the store. Often will attract people who pass by at night and bring them back to buy tomorrow.
3. **A low-cost way to advertise.** You have the windows now. To make them pull more requires little added cost. Often changes the flow of traffic toward the well lighted windows from other streets or regions.
4. **Makes merchandise stand out** and claim attention. Where strong daylight creates reflections high intensity window lighting enables passersby to see inside.

Special Store Lighting

1. **Guides customers** to the profitable merchandise. Leads them to certain departments. Directs store traffic to keep all departments active.

Better Office Lighting

1. **Promotes better efficiency** by eliminating eye-strain and resulting fatigue.
2. **Decreases errors** and thus reduces operating costs. Keeps the organization alert at all times.
3. **Creates a more harmonious atmosphere** and thus helps to maintain the morale of the staff.
4. **Definitely speeds up work** which is 80 per cent visual. Reduces overtime; existing personnel may carry peak without extra help.

(A list of advantages for improved industrial lighting will be found on the last page of this Guide)

If they say "No"—

the chances are that the reason for turning your lighting proposal down will be some variation of the following:

1. **"Can't afford it"—or "It costs too much."**
2. **"Wiring cost is too much."**
3. **"This lighting is good enough"—or—"Later on—"**
4. **"I have another proposition I am considering."**

The way to apply these advantages to such objections or delays is suggested on the next page.

Prospect Says: "NO"

NO. 10B
COMMERCIAL LIGHTING

"Can't afford it—costs too much"

1 "That's perfectly understandable these days, but before you decide definitely, let's see whether, because of the advantages to be gained, it will pay to make an effort to put the installation in now. For instance, if this lighting can increase sales by attracting customers into the store, by displaying your merchandise more appealingly, make it easy to select and buy, and reduce the mistakes in selection of merchandise that cost you money in returned merchandise, don't you think that the cost would soon be absorbed in the savings made? This lighting will present your merchandise more attractively. It will invite purchase, stimulate the impulse to buy and speed up your selling. And besides it will make your store up-to-date, modern looking, easier to keep clean, more efficient. We could arrange financing on the F.H.A. plan and spread the cost over a period that would enable you to pay as you realized earnings from the improvement. Suppose we go ahead on that sort of a proposition? Is that agreeable to you?"

"This lighting is good enough—Maybe later."

3 "Yes, I can understand that you are used to this lighting and that it seems all right. At the time that you had it put in it was probably up-to-date and the very best obtainable. But in terms of today's needs, and with the more efficient lighting equipment now available, are you getting from it what you really want of lighting? In other words, it is more attractive display of your merchandise that you want, a means to speed up selling and reduce selling cost, to keep your salespeople alert, to prevent mistakes in selection of merchandise that mean the high cost of returned merchandise. Measured in terms of such advantages the older installation may be costing you sales and profits by increasing your operating costs. Certainly you may be losing to more up-to-date competitors who have increased their lighting and made their stores more attractive. Why not let me arrange the new installation when it would disturb you the least. Would the first of the week be better than the end of the week?"

"Wiring costs too much"

2 "I know it seems like a lot, doesn't it? It usually does until a person realizes what the wiring will mean in terms of satisfaction and long-time value for the money. I appreciate only too well that wiring has little visible appeal. It is the silent worker behind the scenes, the motor under the hood. But when you consider that a well designed wiring layout will deliver you the full measure of light that you pay for anyway, that with it you will obtain easier seeing, less eyestrain and fatigue, create more cheerful surroundings in which to do work more quickly and efficiently, I am sure your judgment will tell you it is well worth the cost. It will help you to show your merchandise (or do your work) to best advantage. You can reduce mistakes and sharpen the efficiency of your organization. In fact the wiring, to produce these results, is an investment that will keep paying your dividends in better efficiency, lower operating cost and in safety. Let me take care of this detail for you. What do you say?"

"I am considering another proposition."

4 "Fine, I want you to be perfectly satisfied in your own mind about this lighting, so if you want to consider some other plan, you should by all means do so. In making your comparison I am sure you will keep in mind and consider carefully just exactly what my proposition will do for you. Remember, as I showed you, it is laid out to be more than just a lighting job, but to bring you better seeing and all that goes with it. That means increased attracting power, bringing customers to you; an inviting atmosphere that will stimulate the impulse to buy. With it you can speed up the selection of merchandise and conserve the time of your salespeople, thus reducing cost. It will also keep your sales people alert and give them a pride in working in such up-to-date surroundings, a feeling of cheerfulness and assurance that is so necessary to successful selling. Why not get the decision behind you and the work started right away so that you can begin to realize on some of these?"

ROCKY MOUNTAIN ELECTRICAL LEAGUE • PORTLAND GENERAL ELECTRIC CO.
CALIFORNIA OREGON POWER CO. • WASHINGTON WATER POWER CO.

DEMONSTRATE

Since seeing is believing, even when selling your customer the light by which to have HIS customers see better, one of the most convincing proofs of what good lighting will do that you can show him is a good lighting installation in your own place of business. And as long as you are selling lighting make the lighting in your own shop demonstrate some of the equipment you are selling. For example: in the office and show room of your shop, separately switched for individual control and demonstration, install the various kinds of commercial units you handle (as did the progressive contractor shown at the left and below). In the stock room and shop use high bay units and stack lights, etc. Bring your customer in to see them in operation.

PUBLICIZE

These days the company with the "publicity sense" gets more business than the modest one. No need to brag obnoxiously, but let the business world of your town know it when you have installed a good lighting job. Some wide awake contractors issue a folder or a double letter, on the inside of which a clear picture of the new installation (perhaps for contrast a picture of what it looked like before remodeling) is featured. This is sent to all customers and prospects. It flatters the customer for whom the new job has been installed, and it suggests to other prospects the need to keep up-to-date. It is good advertising for the contracting firm installing it. In using publicity of this sort, always include in the letter or announcement some of the advantage points suggested in this Guide. They are the appetite creaters for you.

Lighting in a factory brings some special advantages to the management that are not covered in the lists inside this Guide. In presenting a proposition to the manager of a plant, or in support of a plan submitted to him by the utility lighting service engineers, the following advantages should be repeated and emphasized over and over:

1. *Increased production efficiency*—More accurate seeing by workers helps to speed production without strain.

2. *Smoother day's production* — not subject to variation in mornings and afternoons, or dark seasons, due to poor seeing ability.

3. *Permits night shift operation*—with production just as accurate and active as during daytime. Spreads investment cost over longer production period, lowering overhead.

4. *Helps increase production of automatic machinery, too*—supervision and attendance simplified. Attendant can see conditions quickly; work with machines in greater safety.

INDUSTRIAL SALES POINTS

5. *Better supervision* — foremen can see plant conditions and men more easily.

6. *Permits continuous employment* of many workers formerly considered too old or slow. Skill and experience of older men retained and utilized. Often steadier, more loyal, constructive thinking employees.

7. *Less rejects and spoilage*—greater accuracy of workmanship promoted. Usually even a 10 per cent decrease in spoilage will pay for the lighting installation.

8. *More uniform quality*—better accuracy in manufacture, less failure of the product in use by customers and hence less cost of making good by replacements, service, etc.

9. *Fewer accidents*—most costly to any factory. Poor light is estimated to cause 5 per cent of all accidents, directly, and 20 per cent indirectly. Each disability costs employer an average of $200, plus damaged machinery.

10. *Lower maintenance costs* — condition of plant kept up better because seen better. Less maintenance time on cleaning modern lighting equipment than obsolete equipment.

11. *Better use of floor space*—no dark and unusable areas. Every foot of space can be utilized with equal advantage, machines moved to improve line production, save handling costs, etc.

12. *Improves employee morale*—Gloomy factory is not cheer producing. Difficulty in seeing tests the temper and causes irritations that gradually build up hard feelings toward management. Labor relations are an important part of public relations, nowadays.

Cost of really adequate lighting to the industrial plant can safely be said to run at only about 3/10 of one per cent of the value of the finished product. In such terms it is well worth the investment and the operating cost to your prospect.

replied. "First, we made a good quantity buy. They were all of one model, just superseded by a new model. The merchandise was first-class but so priced that we could make a very attractive figure to the public and still preserve a fair margin for ourselves. We then used some comparatively small newspaper advertisements, starting off with three columns, 14 in. and continuing every two weeks with two columns, 5 in. That was all the advertising they got. However, coupled with our new store, which naturally aroused some interest on the part of the public, it was sufficient to move them rapidly. Also, the fact that a whole carload was to be sold first come, first served got well noised about and had its effect, not only in actual sales but in advertising our new business."

●

Cooler Group

About an El Paso dealers' association organized to sell coolers

In El Paso, Tex., dealers and distributors go after the cooler, commercial-refrigeration and air-conditioning business in a big way. Twenty-five or 30 of them have banded together in an Evaporative Cooler Dealers' Assn. Object: To maintain the high standard of business ethics and cooperative effort that is fundamental to successful operation of any business; to get more business.

Organized last spring, the association charges a $15 membership fee. Multiplied by the number of members, this amount does not net much money with which to carry on organization business. The dealers realized this. Therefore, they permitted any manufacturers' representative anxious to appear before the group to join the association at a $15 fee. Thus there was raised money enough to match the local utility's contribution and advertise fairly extensively via newspapers and radio.

This promotion took the form of educational advertising for the public. In addition, the association prevailed upon local newspapers to present an all air-conditioning supplement with two of their issues.

Association meetings consisted largely of discussions by city plumbing, electrical, health and building department representatives and by others qualified to give complete information on the subject of coolers, etc. For example, Jeff Hudson, air conditioning and refrigeration engineer for the El Paso Electric Co., conducted a series of talks designed to assist the dealer in sizing and typing the equipment for the prospective customer.

The association maintains a 24-hr. service for customers. Service personnel is composed of well-trained, efficient men who have passed the examinations required by the El Paso Refrigeration & Air Conditioning Board of Examiners.

That the association has achieved its objective, even in its first half-year of life, is proved by the fact that in spite of the cool weather this summer, four times as many coolers were sold as during the extremely hot summer of 1937.

●

Future Campaigns

Twenty-one utilities prepare for November-December business

Following are the utility-dealer campaigns which have been scheduled for the next several months:

B. C. Electric Railway Co.—In December the company will hold its usual Christmas-gift sale on all lines of electrical appliances. There will be Christmas decorations and activities in all salesrooms.

Central Arizona Light & Power Co.—October and November, IES-lamp campaign backed by educational demonstrations.

City of Seattle—November and December, campaigns on electric ranges and automatic tank water heaters. Sales will be increased through an active employee-customer prospect contest. The campaigns will be bolstered by extra newspaper advertising and electric cooking demonstrations in City Light's auditorium.

Colorado Central Power Co.—October, campaigns on IES lamps, commercial lighting, Mazda lamps.

Coast Counties Gas & Electric Co.—November and December, light-conditioning campaign with a free-lamp offer.

Electric Appliance Society of Northern California—In cooperation with the Lamp Buyers' Advisory Board of the Western Furniture Exchange, the society will launch an unusual one-week floor-lamp campaign as soon as the strike of clerks in San Francisco department stores is ended. Drive will be confined to San Francisco and East Bay cities. Designed to tie in with IES national advertising and Better Light-Better Sight, it offers a trade-in allowance of $2.25, including pickup, on any old electric lamp turned in for a new three-light, 100-200-300 reflector-type lamp and shade priced at $14.95 or more without bulb. Advertising will be done by participating stores. Miss Olive Oshanna, City of Paris store, is chairman of the advisory board; George Ackerman, Emporium, heads the lamp-week committee.

Idaho Power Co.—November and December, campaigns on IES lamps and major appliances. During December the company and dealers will run cooperative Christmas advertising.

La Veta (Colo.) Light, Heat & Power Co.—October, lighting campaign.

Mesilla Valley Electric Co., Las Cruces, N. M.—October and November, IES-lamp campaign.

Montana Power Co.—November, IES-lamp campaign.

Mountain States Power Co., Casper, Wyo.—October and November, campaigns on IES lamps and bulbs.

New Mexico Public Utilities Corp., Gallup—October and November, adequate wiring campaign.

Pacific Power & Light Co.—November, light conditioning campaign. December, campaigns on major appliances and Christmas gifts. Radio shows will be held this month in eighteen communities. There will be 23 showings of 1939 radios by all dealers.

Public Service Co. of Colorado—November and December, IES-lamp campaign. During December the company will feature the slogan, "Give Something Electrical for Christmas."

Puget Sound Power & Light Co.—Started September 12 and ending Nov. 5 is a "Big Apple Campaign." Cash prizes and other inducements for salesmen to sell ranges, water heaters and refrigerators are offered. Standing of the contestants is based on the number of "boxes of apples picked." Original sale of a water heater counts as six boxes; replacement, three boxes; range, four boxes; replacement, two boxes; refrigerator, two boxes; replacement, one box. Contest is divided into two periods. During qualifying period, from Sept. 12 to Oct. 2, salesmen competed for places in three grades: "Extra Fancy," "Fancy" and "Orchard Run". Twenty highest men were placed in each of the two best grades; others fell in last grade. Special prizes were offered in each class. During five-week final period, salesmen will compete for cash prizes. They will start all even, but better prizes are offered to winners in the "Extra Fancy" grade than in the "Fancy" grade, etc. Sales quotas set for all districts total 336 water heaters, 520 ranges and 104 refrigerators. Contest is dedicated to the apple industry, now harvesting.

A bunch of Utah Power's lamp-bulb cartons. Last month displays featured better light for children returning to school

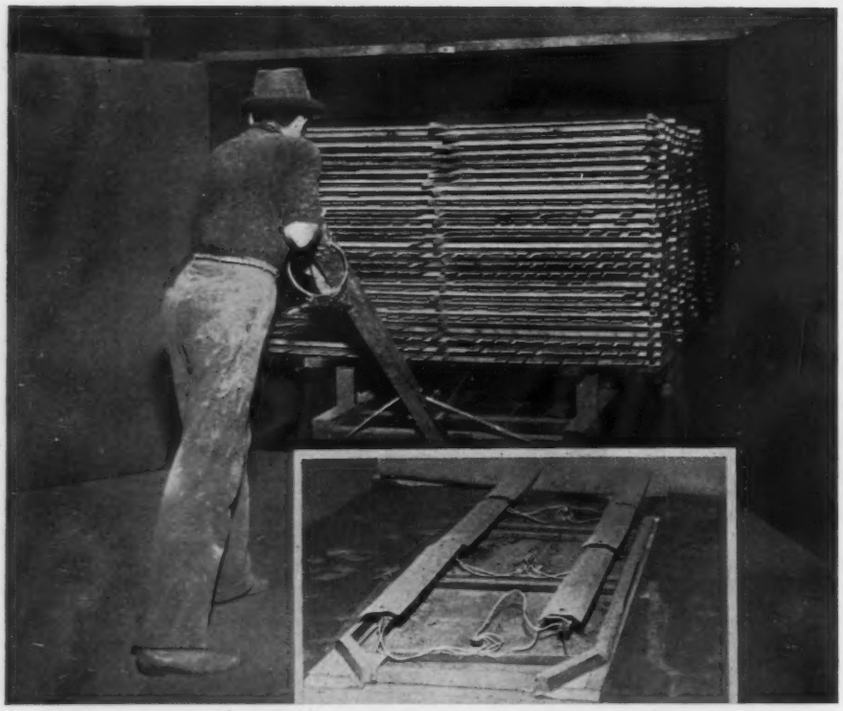
San Diego Bureau of Radio & Electrical Appliances—Sixth annual electrical exposition will be held from Nov. 29 to Dec. Last month the bureau ran 100-in. laundry-equipment advertisements in the city's three papers. No tie-in-copy was permitted to run on the same page with the bureau ad.

Sheridan County (Wyo.) Electric Co.—October, washer and ironer campaign. November, small-appliances campaign.

Southern Colorado Power Co.—November and December, campaigns on vacuum cleaners and IES lamps.

Trinidad (Colo.) Electric Transportation, Railway & Gas Co.—October, radio show.

Utah Power & Light Co. and subsidiaries—October, November and December, campaigns on light conditioning (featuring IES lamps), lamp bulbs and ranges and water heaters. Company activities were outlined in meetings held in all divisions last month by J. F. McAllister, Ken Browning and Nancy Finch. Employee volunteers will concentrate on lamp



A load of blind slats goes into the Venetian Blind Mfg. Co.'s electric drying room. Inset: Close-up of the strip heaters placed on racks on the floor

bulbs and IES lamps; range and water-heater sales are handled by competing crews of range salesmen. Coca Cola carrying packages (see cut) gave the idea for the lamp-bulb carton, embellished with Reddy Kilowatt and listing on each side the lamp-bulb sizes required for various kinds of lighting fixtures. Quota of 7,000 cartons, selling for 95c each, has been set. Contained in the cartons are one 60-watt, one 75-watt, three 100-watt and one 150-watt lamps. Customers may pay for the bulbs by having the price added to their light bill.

Valley Electrical Supply Co., Fresno, Calif. —October, range campaign. November, lighting campaign.

●

Industrial Sales

A blind manufacturer cheats the weather by using electricity

Clyde R. Alling's Venetian Blind Mfg. Co. of Culver City, Calif., used to dry the paint on blind slats in the open air and sunshine. This proved satisfactory most of the time, but during damp weather the drying period was lengthened uneconomically.

An industrial heating engineer of Southern California Edison Co. went over this problem with Alling and found low cost of installation and operation and safety were major considerations to be studied before any improvement was made. Finally, however, a feasible method of meeting these requirements was discovered. It entailed construction of an electrically heated drying room.

This drying room consists of a frame 8 ft. wide, 6 ft. high and 10 ft. deep, made of 2x3 lumber and lined with insulating material. Adjustable vents are provided on both sides at the top and bottom of the room.

Heating equipment comprises six 1-kw,. 230-volt strip heaters. These are mounted in units of two on racks on the floor. A thermostat, bulb of which is at the top center of the room, controls the operation of the heaters through a magnetic contactor.

Ordinarily the operating temperature of the drying room is from 110 to 120 deg. F. The slats are moved into the room on special racks and are thoroughly dried in a few hours. Because of the automatic temperature control, a load of slats, placed in the room at quitting time in the evening, can be removed, ready for use, the next morning.

Alling reports that the room is entirely satisfactory in operation.*

●

Sales Shorts

Home service advisers; drug store; goodwill gesture; etc.

BEGINNING WITH its fall IES-lamp campaign, Montana Power Co. is making a change in the responsibilities of its home service advisers. Henceforth they will devote half their time to the sale of IES lamps and lighting in the home; the other half to general home service work. Regular sales crew of the company will not sell lamps this year. The company, which has slowly been cutting down on the number of appliances it sells, now handles only refrigerators, ranges, water heaters, dishwashers and IES lamps, all items which need more expensive promotion than the dealer can give.

●

OUT OF THE ORDINARY is Anderson Drug Co.'s complete electric appliance department and service department for appliances, radio and refrigerators. The drug store, which has been in the appliance business in Montrose, Colo., for ten years, recently installed a testing panel for servicing of appliances and radios. C. V. Nash is sales manager; Nick Carter, technician.

●

AS A GOODWILL GESTURE, Auerbach Department Store, Salt Lake City, has installed four 10,000-lumen sodium vapor lamps on the intersection on which the store is located. The company will pay all costs of installation and maintenance.

●

ALMOST EVERY UTILITY in the West will this month tie in with the Modern Kitchen Bureau's "Discovery Month" promotion of ranges and water-heaters. Also being supported, though to a smaller extent, is National Washer & Ironer Week, Oct. 23-29.

●

MONTANA SALESMEN of General Electric Supply Corp., Butte, signed up 406 per cent of their dollar quota and 95 per cent of their dealer quota in the recent radio dealer franchising campaign.

●

THREE PRIZES of $100 each will be awarded next year to the Puget Sound Power & Light Co. employees who submit the best ideas to improve operations of the accounting, sales and operations departments. Contest, which started Sept. 1, will clsoe Dec. 31.

●

WILLIAM H. LEININGER, advertising manager of Bendix Home Appliances, Inc., last month left South Bend, Ind., with a team which will conduct sales meetings in the West. Object of the tour, one of three being made, is to announce fall advertising plans and a $27,000 retail sales contest, conduct sales training courses, etc.

●

SUSTAINED LIGHTING SALES activity was launched this month by General Electric Supply Corp. Five traveling shows will give performances in 75 key cities and at 300 trade and consumer meetings. According to G. E. releases, the drive is "designed to render a super

* Any PCEA member desiring a reprint of one of this industrial power series may be put on the mailing list by filing his request with the chief commercial executive of his company.

service to customers and prospects in the commercial, industrial and utility fields."

●

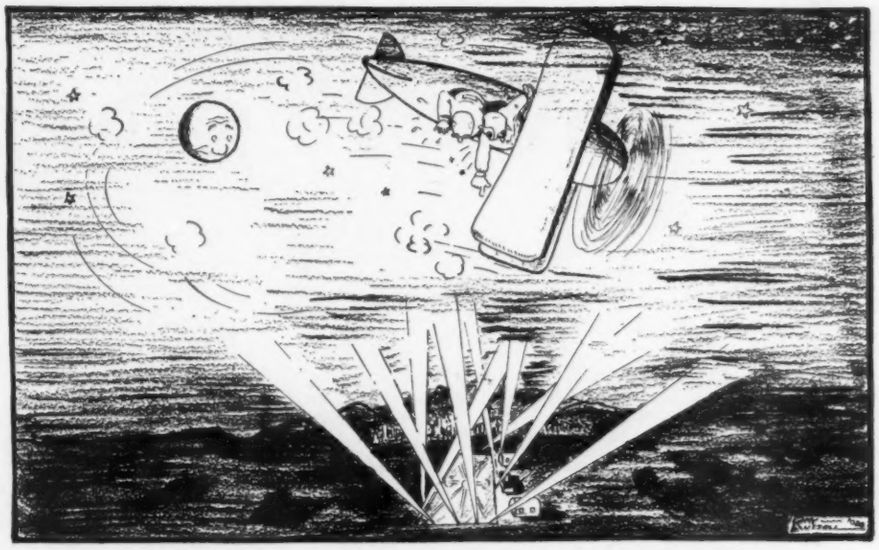
ENSEMBLE SELLING is being applied to the washing machine by two Salt Lake City furniture stores. Southeast Furniture Co. advertised a $49.50 special of a 16-piece laundry outfit consisting of a rinse tub, clothes-drying rack, roller clothes basket, clothes hamper, ironing board and soap. Standard Furniture Co. advertised a $59.95 outfit of fourteen pieces, including electric iron and cord, folding ironing board, soap, etc.

●

DISPLAYS AT the Canada Pacific Exhibition at Vancouver were dominated this year as usual by B. C. Electric Railway Co. The utility occupied one-eighth of the entire Manufacturers' Bldg. and had further displays in the exhibition grounds. Devoted to agricultural and horticultural appliances, these latter exhibits were given an animated touch by six Jersey cows, comfortably housed in the model electrically equipped barn, and chickens in the electric brooder displays.

HOG-WILD WITH LIGHTS

—By Russell



"It's that new illumination guy again. He used to be in the Navy"

IRONER CAMPAIGN, sponsored by the Electric Appliance Society of Northern California, for San Jose, has been handicapped materially by the inability to obtain stock from the strike-bound warehouses of San Francisco. Little advertising has been done, but the feature of increased price to pay for three home demonstrations for each ironer purchased is maintained by all stores.

APPLIANCE SALES REPORT---AUGUST 1938

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		L. A. Bureau of P. & Lt.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Lt. & P. Corp.[6]		Southern Calif. Edison Co. Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.[9]	
	Current	8 Mos.	Current	8 Mos.	Current	8 Mos.	*Current	*7 Mos.	Current	‡8 Mos.	Current	8 Mos.	Current	8 Mos.	Current	‡8 Mos.	Current	‡8 Mos.
Ranges	624	3548	439	3128	93	720	349	2258			112	958	255	2076				
Water Heaters	264	1661	132	991	19	144	247	1363			55	437	128	823				
Air Heaters, aux.	7	369	13	491			113	2658			6	135	31	806				
Air Heaters, 220			23	283			63	441			22	238						
Refrigerators	331	4893	3641	22176	438	4346	4309	26573			337	4154	4016	24,940				
Dishwashers	2	14	24	184			16	91			7	51						
Washers	267	2611	1843	12930	486	3468	2614	15997			221	2039	2512	16,237				
Ironers	31	314	398	2504	94	387	537	2825			33	521	272	2119				
Vacuum Cleaners	45	903	609	4029	194	1745	1864	13528			38	619	1171	7054				
Radios	427	4320	2961	20383	624	4799	7784	53898			328	3519	4085	30453				
Mixers	38	519	198	1251			338	2146			37	319	445					
Cookers, Casseroles	30	254	113	658							60	359						
Irons	379	3152	632	4812									1158	7625				
Waffle Irons	94	938	298	1794							90	586	310	2456				
Toasters	126	1263									136	961	445	1783				
Table Stoves	212	1299	143	1311	772	6299					82	905						
Heating Pads	19	383	33	845							15	248	89	1191				
Curling Irons													38	294				
Coffee Makers	130	1283	101	619							140	875	257	2232				
Sewing Machines	6	137					334	3283										
Clocks	75	396	255	1647							114	1089	419	3748				
Fans	189	1394											723	2024				
Floor Polishers			240	1074														
Sun Lamps	4	49											23	187				
Reflector Lamps	124	1474									117	1066						
Miscellaneous Lamps	157	2377			448	4440												
Yard Lights											32	360						
Misc. Small Appl.			232	1909							55	747	494	4764				

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.

[3] Combined dealer and company sales from report of Montana Power Co.

† Does not include dealer figures for two divisions for January and February, 1938.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. *Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.

[7] Includes reports from dealers on San Joaqin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

[9] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.

‡ August figures were not available at time of going to press.

Needed: An Enforcing Code

They like their picture taken, yes. But good lighting means happiness, too

Architects and engineers realize the importance of proper school lighting, but because there is no code to compel a minimum standard they can do nothing to protect childrens' eyes

By ROBERT E. LLOYD
Consulting Engineer,
Los Angeles

WHAT is the purpose, the meaning, the ultimate reason for all the stew and bother about conduit sizes, wire sizes, switch capacity, minimum drop, minimum watts per square foot of floor area, etc., if they do not actually as well as theoretically result in good lighting? What purpose is served by making a perfect or near perfect wiring layout and then abrogating the whole thing by the installation of an inferior collection of sight-destroying lights under a poor reflecting surface?

These are questions which the architect and engineer on school-lighting jobs frequently ask themselves. To them, school lighting is a headache because there is no legal method of enforcing a minimum standard of efficiency.

When an architect retains an electrical engineer to design the electrical system in a building, he acknowledges the fact that the engineer is an expert on interior wiring and lighting. Nevertheless, the engineer often feels delinquent in the performance of his work because he knows it doesn't always result in good lighting. When he views the final result in some classrooms he feels that he has cheated the children because he was unable to control all the factors essential to proper lighting.

But what can he do about it?

The difference in cost of modern, scientific lighting units over the cost of mere glassware gadgets (euphemistically called lighting fixtures) is such a small fraction of the total building cost that it is hardly worthy of consideration. Yet we lay great stress upon acoustical plasters, use inferior paints with poor reflecting values and improper colors and ignore the most vital factor in civilization, *seeing*.

We cannot get away from the fact that easy seeing—the elimination of glare, eye-strain, nervous tension and the consequent neurotic complications—is the most essential requirement of any classroom. The architects realize the importance of proper lighting, but, in the absence of any enforcing code, they are unable to compel even a minimum standard of efficiency. The National Electric Code, the state code, the county and city codes all agree upon a minimum wiring capacity for classrooms, but none of these codes say one word about glare or ft.-candle intensity in the working level; and none of the inspection authorities has the legal power to demand even a minimum intensity of light, not to mention other essential factors. In other words, a classroom may be wired for more than the legal minimum capacity, but lighting fixtures and lamps may be, and often are, installed which use less than the wiring capacity, have low efficiency and much glare.

Slow Progress

For many years the NECode has required a minimum wiring capacity for classrooms of two watts per square foot of floor area, regardless of ceiling height or other conditions. The new code requires three watts per square foot, and the next issue of the code will also require a minimum intensity of light. Thus we slowly progress in the essentials of life while we advance by leaps and bounds in non-essential luxuries.

In one county in southern California several hundred mothers signed an open letter to the school board declaring that they would not send their children to school on cloudy days until the classrooms were equipped with proper lighting. I was reliably informed that this attitude was not inspired by any representative of a power company or fixture company, but solely by the mothers research into the subject of lighting and seeing. That shows a trend that cannot be ignored.

The state law which gives power to various inspection authorities is based upon the premise that the State of California has the constitutional right to protect the citizens from fire hazard and from any hazard to life and limb incidental to their employment as well as in their homes. Under this law, the

proprietors of all sorts of industries are compelled to install elaborate and expensive equipment for the protection of fingers, toes and eyes from fire or mechanical mishap; but if eyes are deliberately impaired and eventually ruined by inadequate and improper lighting, there is no recourse and no compensation. When I say "expensive equipment" I mean expensive when compared to the haphazard installations used before this law was effective; but actual statistics prove that this equipment pays for itself in a short time by many savings.

Ten Fingers or Two Eyes

The California State Industrial Act is good, but I sincerely believe that in our present state of civilization a man can operate more effectively with a few fingers or a hand missing than he can with ten perfect manual digits—and two defective eyes. It would seem that if the state has the right to protect a citizen from the possibility of accidental physical injury, the state should also have the right to protect him from absolutely certain impairment of his vision which is the direct cause of many physical accidents as well as nervous maladies. The law is either unconstitutional or too limited in scope. That is a matter which the American Institute of Architects and every organization interested in raising our standard of working and living should be eager to rectify.

If the insurance companies were paying claims every day for eyes injured by sub-standard lighting, it would not be long before the law was altered or broadened for the purpose of reducing the casualties. Why, then, should not all who are interested in the visual and nervous condition of the coming generation (as well as their own) do their best to promote the adoption of legal minimum standards of lighting for schoolrooms and other rooms where proper lighting is essential?

It is true that some school boards have equipped a few classrooms with proper lighting to take care of the children that come to them with defective vision. But they overlook the fact that many new patients do come, or at least should come, from the poorly lighted rooms to these better-sight rooms. It is a proved fact that even adults with long-standing visual troubles often react to proper lighting to the extent that they are able to discard their glasses and see without strain. If a child with slightly subnormal vision is placed in a poorly lighted room, his vision gradually becomes worse; but if he is placed in a room that is properly lighted, his vision will gradually become better. For that reason *all* classrooms should be properly lighted. All not just a few.

Imagine a classroom that was equipped with sharp-edged seats which tended gradually to paralyze the leg nerves so that the children limped more and more each week. How long would those seats remain in use?

If eye deterioration was as self-evident as a crippled leg or a humped back, the cause would be soon removed or rectified. But because injured eyes do not impinge upon the consciences of teachers and parents, they are ignored until too late. The damage, in most cases, cannot be easily repaired, and usually results in a life-long handicap.

In view of the usual lighting fixtures in actual use in most of the classrooms, it is a mistake to attempt to achieve proper lighting by merely increasing the wattage of the lamps. Generally where the units are not of the proper type or quality, increased wattage improves the ease of seeing in only a few favorable spots (which were already the best spots in the room) and *increases* the difficulty of seeing in a large part of the room.

As a general rule it is safe to state that all classrooms should be lighted by totally indirect units, and, because it is a vital part of the lighting installation, the ceiling should have the highest reflective and diffusing qualities obtainable. In many cases to my knowledge it has been possible to furnish proper lighting in the classrooms—at less money than the amount allowed in the budget—simply by using efficient instead of decorative units. Direct lighting is all right for corridors, outside areas, toilets and other locations where no intensive visual work is required because of greater intensity for a given wattage and a lower cost per unit.

Minimum Standard of Lighting Units

The light delivered to the working level of a classroom should be adequate, uniform and free from glare at *all* points. This condition can be obtained when the electrical engineer has to consider only lighting units that meet or surpass a minimum, acceptable standard of "seeing"—which means the minimum ft.-candle intensity throughout the working level, with the greatest diffusion possible and the least amount of glare.

All architects and engineers consider it to be good ethics and practice to specify minimum standards of quality for wire, conduit, switches, etc. It is more important to specify a minimum standard of lighting units. The salesmen of inferior lighting equipment avoid the architect and engineer, to whom they must prove their statements, and put the well-known high-pressure on the officials of the school board instead.

Many persons think that artificial lighting is not important in classrooms because it is not an all-day factor every day of the year. The architects deserve a lot of credit for their steady and unvarying efforts to introduce all possible daylight into the classrooms; but when artificial light becomes necessary, nothing but adequate light should be used.

There also seems to be a tendency to slight the lighting in the lower grades, presumably because the pupils are not required to do intensive visual work for long periods. This is a serious error. The eye specialists all agree that the young child should use larger type and have better light than adults. Impairment of vision occurs more readily and more certainly with children than with adults if the lighting is not adequate. In view of the rapidly growing vogue for night classes for adults, many of whom have lost a large part of their visibility, adequate lighting becomes not only more desirable but imperative.

Proper Correlation

There are several factors involved in the design of a lighting system that must be properly correlated in order to guarantee the desired result. We may, but should not, accept the minimum wiring capacity as fixed. We may, and must, accept the floor area and ceiling heights as fixed factors. That still leaves several variable factors which will determine whether the lighting will be good, fair or pernicious.

The ceiling height bears a definite relation to area, horizontal spacing, capacity required to attain a pre-selected intensity, the length of fixture hangers and the type of unit most suitable to the room. The engineer can determine the proper spacing and suspension-height only when he knows the type, size, efficiency and distribution curve of the unit to be installed, and the reflective coefficient of the ceiling surface.

The reflecting surface of ceilings and upper walls is really a part of the lighting system, and the architect and engineed should give careful attention to the color and to the reflective coefficient of the paint to be used. The most expensive paints do not reflect the greatest light values, and the cheapest paints, no matter what their reflective values may be when new, deteriorate and discolor too rapidly to deserve consideration.

Knowing the type and efficiency of the lighting units to be used, the dimensions of the room and the reflective coefficient of ceilings and walls, the engineer can so design the lighting to guarantee an even, adequate light intensity, free from glare and excessive contrasts, throughout the working level.

Then every classroom will be a better sight room. And eyes will be saved.

Public subscription to raise funds for a street- and highway-lighting project is something new. Hence the City of Butte, Mont., merits special mention. There the mayor and chamber of commerce are sponsoring a drive to light a mile of Harrison St. with sodium vapor units. Sought is a fund of $8,000, of which over $5,000 had been subscribed early in September. Montana Power Co. made the largest contribution. Above is shown thermometer of donations

Skeleton House

Complete wiring installation displayed at Vancouver Exhibition

An "X-ray" view of an efficient wiring installation was afforded visitors to the annual Vancouver (B. C.) Exhibition this year by the adequate wiring home display of the Electrical Service League of British Columbia in cooperation with the Vancouver Electrical Assn. Exhibited was the frame for a five-room house with the wiring setup visible.

Living room, kitchen, bedroom, bathroom, laundry and front- and back-door wiring were embodied in the layout. In each room the wiring circuits were clearly visible. Also shown were suggested arrangements for appliances and convenience outlets.

Persons visiting the exhibit were escorted through the rooms by association attendants who explained each room's points of interest in detail. Prospective home-builders or those contemplating alterations in the wiring of their present dwellings were furnished with illustrated literature.

Although thousands were attracted to the display, the aim of the sponsors was to provide definite information for those seriously interested in adequate wiring rather than for those just casually sightseeing.

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Adequate Wiring

What three wiring associations are doing to promote it

ONE METHOD used by the Electrical Development League of Southern California to promote the certification of adequately wired homes is the insertion in want-ad columns of Sunday newspapers of the following: Q—Is there any plan available telling the essentials of proper wiring for homes? A—Yes. The Electrical Development League has prepared a set of minimum requirements for adequate wiring. They may be reached by calling . . . etc."

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ADEQUATE WIRING ASSN. of Idaho will this fall launch a series of apprenticeship classes in conjunction with the State Board of Education. According to W. A. Hopper, who negotiated with board of education officials on the matter of teaching staff, the classes will be strictly technical. The association also hopes to promote better inspection of wiring in small towns by urging combination building, plumbing and electrical inspectors to attend the classes.

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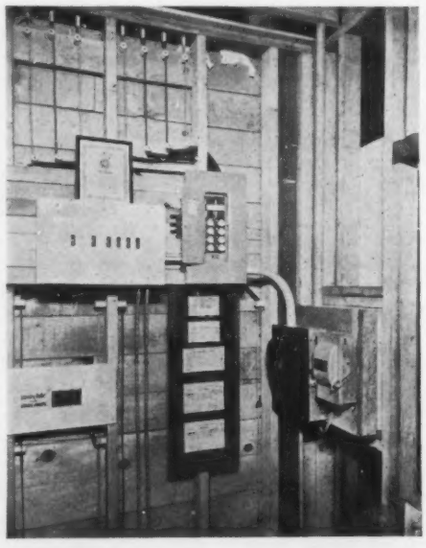
TO PROMOTE its adequate wiring program, the Electrical League of Utah has issued a booklet of certified wiring specifications, sent to every prospective home-builder in Salt Lake City a broadside stressing the need of adequate convenience outlets, printed a slogan for adequate wiring on the back of tickets for the demonstration lecture of Dr. Phillip Thomas, Westinghouse, and is contacting every home-builder that it can reach personally.



Three views of the B. C. league's adequate wiring display. Below, left: Exterior of skeleton house. Below, right: Dining room—note chandelier installation. Right: Service entrance

J. W. Alexander, Mrs. and Bill Johnston, and "Tree Tarzan" Stewart

Record Breaking

Is the word for the RMEL's recent meeting at Yellowstone

"Whether you carry a title or a broom, you also carry with you the responsibility to keep the light of Aladdin's lamp burning." Thus did Gaylord B. Buck, Public Service Co. of Colorado, close the record-breaking Rocky Mountain Electrical League annual convention at Yellowstone Park.

"Oil for Aladdin's Lamp" he described as the devoted public service of those engaged in the industry. "When the wicked magician sought to trade old lamps for new," Buck said, symbolizing the utilities' present political situation, "it was for evil purposes, and all the good that Aladdin had done was destroyed."

Other speakers, their messages in a sentence, were:

Dan W. Greenburg, manager, Wyoming State Planning Commission—"The upper basin states are organized to see that Boulder Dam rate revisions still adhere to the original pact, allotting funds to develop water resources for the upper basin states."

L. M. Robertson, Public Service Co. of Colorado, chairman of the League's engineering committee—"Engineers today must interest themselves in accounting, accident prevention, legal aspects, personnel and human relations, as well as select materials and methods for construction."

George Gadsby, Utah Power & Light Co.—"Are we not arriving at a flattening out of production curves that requires new adjustments, less volume, greater acceptance?"

Dr. Adam Bennion, Utah Power & Light Co.—"It's a job—just keeping in business. . . . Not only to save the utilities, but to keep America a land of opportunity and freedom, we must (1) sit down with leaders of thought and tell them, (2) work with them to elect legislators with business sense and experience, (3) use radio and advertising to tell what the fundamentals of American business are, (4) acquaint all employees so that they can discuss them intelligently and scatter understanding."

Lewis A. Lewis, Washington Water Power Co.—"The industry must be organized into a strong selling force to make the Adequate Wiring program the success it needs to be."

W. C. Stephenson, Modern Kitchen Bureau—"The public is ahead of our ability to cash in on this activity. . . . Discovery Month is designed to show that electric cooking costs only half as much as most people think."

C. L. Flower, Colorado Public Service Commission—"Uniform accounting and simpler rates would help your public relations. Rate departments give too many reasons for cumbersome rate structures. Propagandists grasp at such misunderstandings. Regulatory commissions can help by giving factual information to contradict misconceptions."

F. W. Coen, Lakeshore Coach Co., Sandusky, Ohio—"The telephone operator is often more important than the president in the way she treats the public. Take stock to find whether your employees and executives are widening their friendships, are happy in their work."

Glenn R. Trumbull, manager, Better Light-Better Sight Bureau—"There are still 18,000,000 homes that have not yet had a complete home-lighting demonstration."

E. D. Stryker, Incandescent Lamp Dept., General Electric Co.—Explained the "Light Conditioning" dealer program; told of national advertising; predicted 1,000-ft.-candle levels soon.

J. T. Coatsworth, chairman, RMEL lighting campaign committee—Told of the league's long-time lighting program.

Harry V. Corning, dealer, Casper, Wyo.—"An electrical league helps us solve our problems of trade-ins, time payments; measure our efforts, and sell ourselves on electrical living."

Paul L. Lewis, Nash-Kelvinator Corp.—(Speaking on the Salesmen's Crusade) "It is not up to the government. The fellow who has always put the country back into prosperity has been the merchant and the salesman."

Other speakers were: C. J. Strike, Idaho Power Co.; the first man to photograph Yellowstone; Edmund Rogers, superintendent of the park; M. S. Garretson, secretary of the society interested in the American bison; George W. Wheelright III, Polaroid Corp.; Earl W. Hodges, Henry L. Doherty & Co., New York City; Dr. Phillips Thomas, Westinghouse research engineer; K. J. Nelson and Scott Stewart, Nelson Wire Clearance Service, and W. A. Cyr, ELECTRICAL WEST.

In the election, held at the close of the session, W. N. Clark, president of Southern Colorado Power Co., Pueblo, was named president. Others elected were: J. E. Loiseau, Public Service Co. of Colorado, vice-president for Colorado; H. E. Sampson, Southwestern Public Service Co., Roswell, N. M., vice-president for New Mexico; J. W. Alexander, Rawlins (Wyo.) Electric Co., vice-president for Wyoming; Lee O'Connel, Westinghouse Electric & Mfg. Co., Denver, vice-president representing manufacturers, contractors, wholesalers and dealers; W. C. Sterne and Henry Adler, Arvada Electric Co., treasurer and assistant treasurer respectively.

Buck, Robertson; Jacobucci and Johnston

Survey

Shows how 150 Washington farms use electricity

By G. H. BLIESNER*

In order to learn what is happening on farms in the Pacific Northwest there was made in Skagit County, Wash., during 1936-37 a survey to show (1) the relationship of wiring, fixtures and equipment costs to annual kw.-hr. costs and consumptions; (2) the saturation of electrical uses incidental to the different types of farms, and (3) new developments in farm electrification.

The study covered 150 farms—50 poultry farms, 50 dairy farms and 50 general farms. These latter were located along 13.1 mi. of new line extensions and had had utility service for only one year. There were fourteen separate extensions. The dairy and poultry farms (only those using electricity in their dairy and poultry production were studied) had had service for an average of thirteen years.

Of the total of 3,500 farms in the county, approximately 85 per cent had electric service. The dairy and poultry farms represented the better electrified farms and were located in almost all parts of the county. The general farms on line extensions represented a subnormal farm use of electricity even though they were adjacent to each other in each extension group. Because a retail daiyman's or hatcheryman's use of electricity differs somewhat from the average, only shipper-dairy and poultry farms were selected.

For results of the survey, see Table 1.

Little variation existed in the average cost of wiring and fixtures for the poultry farm of 1,200 hens and the dairy farm of 25 cows. On general farms, however, this investment was 50 per cent less because the owners used more second-hand wire, employed farm labor in making installations, had fewer buildings and themselves represented more of a sub-marginal land type.

Costs of wiring for the dairy and poultry farms included much rewiring because of load growth and inadequate initial planning. Costs of wiring, fixtures and devices operated by electricity averaged $680 per farm. The average annual electric bill of $56.50 represented only 8½ per cent of this investment.

The investment per kw. of connected load for general and dairy farms was $90 and $95, but only $65 for poultry farms. This discrepancy is accounted for by the poultry farm's larger connected lighting load. The 150 farms paid an average rate of 2.03c per kw.-hr. for 2,782 kw.-hr. per year. Twenty-nine per cent of this total consumption was for water heating at the off-peak rate of 7.5 mills.

Considerable variation existed in the saturation of electrical devices on the 150 farms. For electric irons, the saturation was 97 per cent; for radios, 93 per cent; for washing machines, 87; for electric water systems, 59 (although 84 per cent of the farms had water under pressure in the houses); for toasters, 55, and for a maximum of 95 other electric uses, less than 50 per cent.

Of the 50 dairy farms, 92 per cent used electric milking machines and 56 per cent used dairy water heaters. Ninety-six per cent of the 50 poultry farms brooded with electricity, and 36 per cent operated electric egg cleaners.

New developments in the use of electricity consist primarily of air conditioning, soil sterilization, plant growth without soil and various motor uses on new agricultural machinery.

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* Excerpts from a paper presented before the rural electric division, American Society of Agricultural Engineers, Pacific Grove, Calif., June, 1938.

TABLE I—Farm Electrical Relationship on 150 Farms

	Average of 50 General Farms	Average of 50 Dairy Farms	Average of 50 Poultry Farms
Investment to Annual Revenue Ratio	8.3	13.6	9.7
Wiring and Appliances Investment ($)	245	1,200	585
Investment per Kw. of Connected Load ($)	90	95	65
Annual Farm Load Factor* (%)	2.90	4.4	3.4
Annual Kw.-hrs. Used	715	4,810	2,820
Annual Costs of Operation ($)	29.40	87.80	60.20
Cost per Annual Kw.-hr. Used ($)	.0388	.0179	.0215
Per Cent Water Heating (Kw.-hr.)	12.5	44.5	30.0
Average Number of Electrical Uses, or Appliances per Farm	5.4	14.4	9.6
Number of Heating Uses per Farm	2.2	5.5	4.4
Number of Motor Uses per Farm	1.4	6.5	4.2
Average Acreages per Farm	56	110	16
Average Number of Cows per Farm	8	25	3
Average Number of Hens per Farm	200	6	1,200

* The annual farm load factor was obtained by dividing the annual farm Kw.-hr. by 8,760 hrs. and then dividing by the connected farm load.

Said to be the world's smallest fan-type incubator is this new California-made product called "Dandelyon." The incubator should be welcomed by amateur hatcherymen as well as game breeders and poultrymen operating on a small scale

Farmer Jones

P.G.&E.'s farm exhibit develops 50 prospects for equipment

When the music stopped and Farmer Jones launched into his homey little talk on the benefits he received from rural electrification, crowds gathered round Pacific Gas & Electric Co.'s exhibit at the California State Fair and the San Joaquin County Fair. Out of those crowds, and as a direct result of Farmer Jones' speech, developed 50 good prospects for farm equipment.

Placed alongside the more sparkling exhibits of other concerns, P. G. & E.'s display might have seemed a trifle shabby. The back-porch of a weather-beaten farm house was the center of attraction. But the four papier-mache, animated figures resting on the porch stirred up interest.

One of those figures, old Farmer Jones, told (by means of a recording) how his farm was going to seed until Son Jeff came out of college at Davis, took over the management and installed a variety of electric machines. Then, said Farmer Jones, things picked up so well that "we're going to start building a new, all-electric home."

Not designed to tell what various items of new farm machinery are, but rather of what benefit they are to the user, the speech only mentioned several appliances — irrigation pump, milking machine, brooder. Effect thus achieved was one of mild entertainment, and the ranch owner who had found in Farmer Jones' words something of special interest quickly passed on to the rest of the exhibit, consisting of a display of specific electric farm machines. That, of course, was what P. G. & E. wanted.

Bill Jones Speaks on Words Words Words

"WHAT has been the dominating factor in bringing man to his present imperfect state of civilization?" The first chap you meet, after a moment's hesitation, will say "Religion"; the next will proclaim "the steam engine," meaning the application of power in any form; the third one will opine that that great organization commonly known as "the Family" is really responsible for man's major accomplishments.

They are all wrong. The answer is "Words, words, words, words."

Getting the right man for a specific job in the world's work is a major problem. Getting a specific individual into the right branch of life's work is still a bigger one. Every employer accumulates gray hairs trying to meet the first, for upon its correct solution rests the prosperity, and possibly the continued existence, of his business. Every man must naturally be desirous of getting himself into the groove he will fit best. Certainly many fathers and mothers spend sleepless hours trying to determine the channels into which sons should be directed. If we might find a thoroughly infallible method of quickly getting the answer to these matters, civilization would over night leap forward a hundred years. And yet it is simple. Words, just words, will turn the trick.

The qualities upon which we can judge any human being (without involving ourselves in such abstract phases of existence as to whether a man himself descended from a collateral branch of gorillas, as Mr. Darrow believes, or whether his real ancestor was a mudhole, as Mr. Bryan thought) are his attainments and characteristics in these things: Knowledge, Judgment, Experience, Energy, Personality, Imagination, Intellectual Honesty.

Intellectual honesty really should be called simplicity, although it is probably dangerous to do so for the reason that simplicity may be taken to mean weakness of intellect. Actually, however, it designates the rare sort of mind which, setting forth upon a journey, takes the shortest route to its destination, and is not diverted hither and thither by the highways and byways of unprofitable speculation. It is the kind of a mind that doesn't mess up a perfectly clear matter with intricacies and complications.

Imagination is an inherent quality of greatness, and usually of success, and always of leadership. It spells vision, foresight, and implies both the constructive spirit and the creative mind.

Now, the new company requires a president. The office boy, with the assistance of words, can select him just as well as can anybody. All he has to do is to use the words given above and set the factors down in their order of relative importance for that particular job. Being a well-trained and thoughtful boy he puts them down thusly:

1. Simplicity
2. Imagination
3. Judgment
4. Personality
5. Knowledge
6. Experience
7. Energy.

Having prepared the specifications for the job, it is but obvious that if he lists the outstanding qualities of candidates for the position, placing their characteristics in the order of their dominance in the case of each individual, sooner or later he will come across a man whose description will consist of seven words in the precise sequence of the requirements. When this matching-up has occurred, there isn't any reason why the specimen selected shouldn't immediately be put to work—or, at least, just as soon as the new letterheads can be printed. If our specifications are right, it is perfectly clear that the man whose list may be in a different order, however desirable he may be for something else, doesn't belong in the president's chair.

Now, of course, this is a skeptical and sin-hardened world and somewhere, sometime, some dissenter is going to rise up and say "Blah! Knowledge and experience which, as everybody knows, are the most important, are at the bottom of the list when they should be at the top. And energy—also at the tail end! Nonsense! Given a man with knowledge and experience and the energy to apply them and you can forget the four other alleged qualifications, which are mostly ornamental anyway." Oh, well, it's difference of opinion that produces alimony. We might deliver a preachment upon that word experience and what it means and doesn't mean, and we might also remark that failure in this life is not so much due to the things which a good, bright man doesn't know as it is to the things he knows which aren't true.

A kindergarten test in mathematics is to work the problem backward and see if you get the same answer. Suppose our office boy, at the same time is entrusted with the selection of a common, very common, laborer. The same list of words will unerringly select him. The president may not like this linking together but there aren't many presidents anyway, and their votes don't count for as much as the laborer's votes, so it doesn't appear necessary to worry about their feelings one way or the other. Use exactly the same list, only turn it upside down:

7. Energy
6. Experience
5. Knowledge
4. Personality
3. Judgment
2. Imagination
1. Simplicity.

And there you have the answer. Doesn't this fact that the top and the bottom of a great organization can be thoroughly catalogued by the self-same words conclusively support Mr. Bryan's contention that all mankind originated in the same clay bank, or does it?

The world is full of jobs and of men, and of words. Place the words in the order of their relative importance for the job. Arrange the same list in the order in which its components best describe the men applying. When they fit you have succeeded in bringing the two together.

Simple—perfectly simple and simply perfect isn't it? Or is it just simple?

EDITORIAL

Publicizing Hidden Taxes

AS ONE of the principal gatherers of indirect taxes, the public utilities have reason to consider seriously the upward trend of public levies which throws an increasing burden on their shoulders. In the last six years the national tax bill has increased 76 per cent. Today 23.6 per cent of all national income is consumed by taxes. A study of taxing agencies reveals that there are 175,369 bodies in the U. S. with the power to levy taxes. Their employees number more than 3,000,000.

Before there can be any stemming of this rising tide, the public must be awakened to its obvious seriousness. The man who thinks he pays no taxes must be made to appreciate that everything he eats, wears, smokes, drinks or otherwise enjoys carries a hidden levy, greater in most instances than he ever would imagine. The electrical industry should commend and perhaps emulate the current advertisement on this subject which is appearing in northern California newspapers over the signature of the Crocker First National Bank of San Francisco. This advertisement shows that 17 per cent of the electric bill, 25 per cent of house rent, 1.1 inch of every cigarette and 20 per cent of a loaf of bread represent contributions to the tax collector. It states:

"For every dollar American industry spends on payroll, it also spends 43 cents in taxes, on $486 for each employee. The Federal tax collector now may take more than 75 per cent of a wealthy man's income, and the state and local taxing agencies a sizable portion of the remainder. Nevertheless, if the tax collectors took all of the income of everyone earning $5,000 a year or more, the total receipts from this source would pay for the cost of government for less than four months. In other words, all of the incomes of the wealthy wouldn't pay more than one third of the tax bill.

"In 1937 about 70 per cent of all tax receipts represented so-called hidden taxes—$8,750,000,000 gathered in small sums from every man, woman and child in the land."

Such advertising may help to apply the brakes. It should be supplemented by similar efforts on the part of more business and industrial institutions.

A Wool-Gathering Expedition

APPOINTMENT by the President of a committee of cabinet officers and other high federal officials to study present power generating and transmission facilities and their adequacy under war conditions gives a new and unique twist to the administration's power policy. By using the alibi of national defense, the apparent hope is to drum up popular interest in a subject in which such interest is obviously waning.

It is safe to assume that the committee will find little information here in the West to arouse the public. Federal projects have provided a plethora of power. And also these projects have been located by the dictates of political expediency rather than with any idea of strengthening national defense. There can be no criticism of the supply or the ability of the utilities to deliver power where it is needed in this region.

Public sentiment out here in the West might provide the committee with some worthwhile suggestions. Why not investigate the conditions which dictate that cotton be plowed under when this crop is an essential ingredient in any first-class war? Why not study the plight of the railroads and the relation of adequate transportation to national defense? Also how can the theory of scarcity with food production be correlated with the demands that might develop in case of conflict? How about communication facilities and water supply? Are these adequate for national defense? These appear to be far more fruitful fields for investigation than does the subject of power.

However, the committee may find that in some sections of the nation there would be a power shortage if industrial loads were increased by war emergency. It may attempt to pin the blame for such a condition on the lack of initiative of the privately-owned utilities. Will it, on the other hand, admit as well that this lack of initiative has been due entirely to the uncertainty over what the federal government's power policy is today or what it is going to be next month or next year? Removal of this uncertainty by some committee, cabinet officer or the President himself would do far more to stimulate business than will any quantity of wool-gathering investigations.

Bonneville Turned Down

WITH so much "political engineering" going on these days, the announcement from Eugene, Ore., of plans for a new steam or diesel peaking station is refreshing, because it is evidently based on sound engineering analysis. About 160 miles transmission distance from Bonneville and at the terminus of one of Bonneville's proposed lines, Eugene might have been expected to have succumbed to the pressure from the Bon-

neville Administration to purchase peaking power from that source; that is, one might have expected this if Eugene had not enjoyed a long-time reputation for the quaint and unique ability to keep politics out of its power operations.

Eugene has 10,350 kw. installed in two stream-flow hydro stations and 6,000 kw. in steam standby. With demand crowding the base-load hydro plants, the city is faced with the need of additional peaking capacity. Obviously it measured the carrying charges on the necessary capital expenditure plus the operating costs of a new fuel unit, against Bonneville's $17.50 per kw.-yr. for primary power and $11.50 per kw-yr. for secondary. It is understood that a PWA grant of 45 per cent of the cost was not the deciding factor in the decision to build instead of buy power; that even if the city had to finance the entire cost, which its credit would readily permit it to do, the decision would still have been in favor of installing a new unit. The answer must have been, as the electrical industry fully understands, that Bonneville power is not cheap except to those who can use it for base load, and only then on a reasonably high load factor.

The foregoing comments are not indulged in the spirit of gloating over Bonneville's loss of a potential piece of municipal business. Quite the contrary, ELECTRICAL WEST hopes that Bonneville power will be sold as quickly as possible on a basis that will bring great economic benefits to the Pacific Northwest. ELECTRICAL WEST, being engineering minded at times, cannot help applauding a decision by a public body based on sound engineering principles, when so many public bodies today base their engineering decisions on political considerations.

Making Friends

ALONG comes a chap named Dale Carnegie who analyzes and then states simply the things that people should do to make friends; the things to avoid to keep from making enemies. How do the rules apply to Business?

Has Business—this electrical business, for instance—failed to do the things that make friends? Has it blindly and unconsciously done those things which have made people envy, hate or fear it? This is a pertinent question, these days, before attempting to improve what is called "public relations." In simpler language, what is "public relations" but the making of friends?

Has not Business—this business—flaunted its prosperity? Has it boasted a bit of how much money it has spent for this or that? When it makes a public statement—an advertisement or a press release—what does it say? What picture does it set forth before the public? Does it harp on how much it has paid for a power plant, how much it spends, the figures running up into realms that are beyond the grasp of the average man and only mean "wealth" to him? Hasn't the tone often been a bit more boastful than tactful?

Hasn't this industry given the impression of bellyaching about paying its share of taxes, mistakenly supposing to arouse sympathy, but only creating envy and distrust that it was "rich" enough to pay so much and complain about it?

In an individual such actions are considered bad taste, welching. In a business the same sort of public reaction is only natural.

A salesman for the firm would never dare some of the attitudes that the Business for which he works often assumes. He would be thrown out. Perhaps that is what the public—expressed by the Administration—is doing to Business today, kicking it out until it mends its manners.

There is yet time in America to come back to the same public more modestly, more helpfully, less concerned with credit for past achievements than with what Business can do for the public today and tomorrow. Business has services of infinite value to sell to the public. It has a superior method of distribution of wealth, of production, of opportunity, of invention and development. It has and can render this service better, at lower cost, and make it available to more people than under any other system.

Let it sell that system, and itself, back to the public by the simple rules for making friends. They are, after all, the same basic rules as those for good salesmanship of the products it has sold so successfully.

NRA in Reverse

WHAT'S kosher today is verboten tomorrow. Now the same government that hustled business men into associations to solve their business problems under NRA prosecutes them for going into any sort of huddle at all. If the essence of charm in a temperamental woman is her frequent change of mind—the unpredictable nature of her dictates—perhaps that is the reason one hears of the great personal charm of the head of this nation. Keeps one agil and spry, though, trying to figure out which way to jump to escape Alcatraz or Leavenworth or some other prison.

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND ITS APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

NEWS OF THE INDUSTRY

SAN FRANCISCO TO VOTE IN JANUARY ON P. G. & E. PURCHASE

Labor and politicians took a hand in San Francisco's municipal ownership problem last month. They persuaded the board of supervisors to refuse the proposed charter amendment calling for the issuance of $55,000,000 of revenue bonds for the purchase of Pacific Gas and Electric Co.'s city distribution system a place on the November ballot.

Excuse for the plea, which means that a special election will be held after Jan. 1 in spite of Mayor Rossi's desire to meet Secretary of Interior Ickes' request for immediate action, was that postponement would give labor more time to support the campaign and focus attention on the issue.

Under the amendment, designated Plan 8, the city will use the $55,000,000 to purchase P. G. & E. facilities; construct the Red Mountain Bar power house on the Hetch Hetchy water supply system at a cost of $1,125,000; erect shops, offices and warehouses at a cost of $2,000,000; devote $175,000 to materials and supplies, and $700,000 to working capital.

The plan was submitted by Utilities Director E. J. Cahill. It would enable the city to comply with the Raker Act and the recent decision of the federal court upholding the act's provisions.

By authorizing the issuance of revenue bonds, the proposal would require only a majority vote. A similar $50,000,000 plan was defeated in March, 1936, by a vote of 78,101 to 65,762. Five other assorted plans for engaging the city in municipal ownership were turned down by the voters prior to that.

The court decision has been appealed.

LIGHTNING STORMS early last month brought a series of interruptions to B. C. Electric Railway Co.'s service and a hectic period of mopping up for the engineering department. The storms were of such severity and duration that the Vancouver steam plant got a head up to assist in case of need. Engineering statisticians, computing storm damage, reported that 31 transformers burned out; 27 of the 2,300-volt cutouts were damaged; 693 of the 2.300-volt fuses blown; 20 of the 12,000-volt fuses blown, and nine of the 12,000-volt fuse tubes damaged. Only the company's multiplicity of power plants and transmission lines is credited with saving the lower mainland from "a serious situation."

APPLICATION has been filed with the California Railroad Commission for authority to merge the businesses and assets of Southern Oregon Gas Corp., California Utilities Co., Needles Gas & Electric Co. and Weaverville Electric Co., operating in California and Oregon. The companies are subsidiaries of Republic Electric Power Corp. The merger is asked as a means of enabling Republic to consummate a revised plan of reorganization filed with the SEC. Southern Oregon Gas Corp. would be the surviving entity.

EUGENE TO CONSTRUCT PEAK-LOAD POWER PLANT

Plans of the Eugene (Ore.) Water Board for construction of a peak-load power plant took a step forward last month when PWA allotted $274,833 for that purpose.

J. W. McArthur, general superintendent of the city's power system and secretary of the board, states that the peak demand of the Eugene system will soon exhaust the capacity of its stream-flow hydro plants. With the help of the new $610,740 peaking plant, however, it will be able to carry the load for some years. Both steam and diesel are being considered. Added capacity of approximately 7,500 kw. is desired. Present capacity is 10,350 kw. in hydro, 6,000 kw. in steam standby.

R. B. Boals, recent superintendent of the Fairbury, Neb., municipal system and formerly professor at Oregon State College, has been employed to assist in the design of the proposed unit.

HYDROELECTIC PROJECT PLANNED FOR LOGAN, UTAH

Declaration of intention to construct a $120,000 hydroelectric project in Logan, Utah, was filed last month with the Federal Power Commission by the George A. Bell Power Co. of Logan. It is proposed that energy generated by the project would be sold to the city for less than the cost of energy now generated by the city with diesel engines.

The project would consist of a concrete diversion dam 60 ft. long and 5½ ft. high across the Logan River, with 6,500 ft. of wood-stave pipe-line leading to the power house with installation rated at 730 hp. under 74-ft. head.

Organization of a power district embodying towns in the immediate vicinity of Logan is also under consideration.

WORK STARTS ON CENTRAL VALLEY PROJECT

Work on the $170,000,000 Central Valley project started last month when the first shovel of dirt was removed at the east end of the abutment on the site for Shasta Dam.

At approximately the same time Pacific Gas and Electric Co. started construction of a 9,000-kw. substation which will furnish power for the entire project, and the U. S. Dept. of the Interior and the Southern Pacific Co. signed a contract by which the way is cleared for the Bureau of Reclamation to relocate telegraph wires and 36.4 mi. of main-line railroad between Redding and Delta, Calif.

Completion of the substation, which will connect with the 60,000-volt line running down the west bank of the Sacramento River, is expected by the end of this month. Two years will be required to finish the railroad relocation.

Frank Crowe, superintendent for Pacific Construction Co., which won the $35,939,450 contract for Shasta Dam, said 346 men were at work on the dam itself.

Boring of a tunnel for the temporary rerouting of Southern Pacific tracks was started earlier this summer. Upon completion of the permanent track route, the tunnel will be used to divert the river around the dam construction.

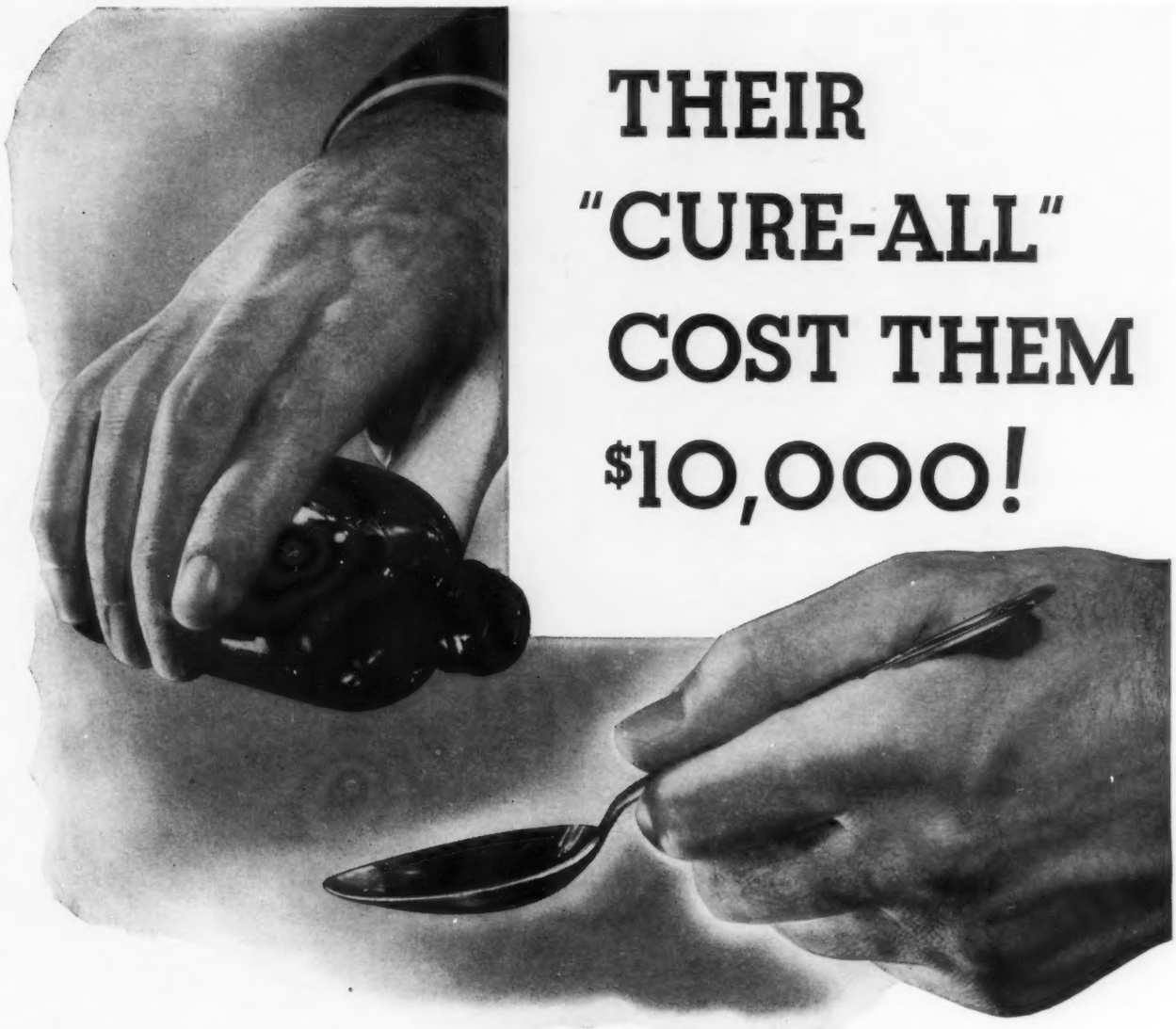
$3,000,000 PLANT PROPOSED BY OGDEN COMMISSION

Two weeks after Ogden, Utah, voters defeated four proposals to enter into a contract with A. C. Todd for construction of a municipal power plant through the issuing of $2,600,000 in revenue bonds, the Ogden city commission took steps to construct a $3,000,000 power plant.

The action was taken Aug. 23 upon motion of Commissioner Edward T. Saunders. The commission passed a resolution and ordinance calling for the issuance of $1,650,000 in revenue bonds to be matched by a proposed PWA grant of $1,350,000.

Vote was to be held on the proposition late last month.

FIVE MILLION TONS of earth slid from the upstream face of Fort Peck Dam, Mont., federal flood-control unit, last month. At least eight workmen were killed. Cause of the slide, which extended for 2,000 ft., and 100 ft. deep, is now being investigated.



THEIR "CURE-ALL" COST THEM $10,000!

Read How Shell Engineers Solved This Coal Company's "Cure-All" Problem

THE G. & F. Coal Company of Brazil, Indiana, operates a number of strip coal mines in Clay County. Diesel-powered draglines and shovels produce about 3,000 tons daily.

At the height of their busy season —February, 1937—the company was prevailed upon to try a "cure-all" lubricant. This oil was "guaranteed" to end ring-sticking forever in their Diesels.

Six months' operating with this lubricant told the story. One by one, these engines went out of commission. Complete overhauling cost $1,000 per machine! Production fell off 50%! Orders amounting to $10,000 were lost!

Shell was called on to stem the tide of losses. Working with the G. & F. maintenance men, a complete survey of the engines was made. The answer was obvious. Not a "cure-all," but the proper Shell Diesel Lubricant for this type of equipment.

Results were immediate. Ring-sticking was reduced to a minimum. Production returned to normal and again orders were being filled on time.

• • •

In thousands of American mines, mills and factories, Shell men, working with Shell Lubricants, are achieving results like this. For Shell applies to your problem the ingenuity and resourcefulness gained from solving countless problems of industrial lubrication—and the finest lubricants being refined. This "plus" in lubrication is always available to you. Simply call or write your nearest Shell office.

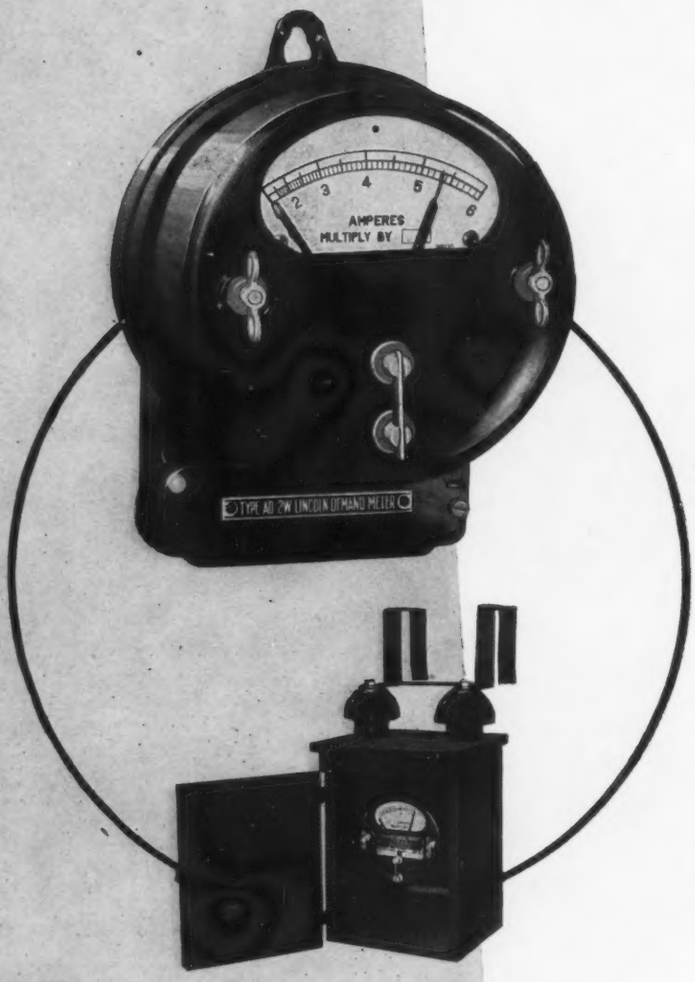
SHELL

SHELL DIESEL LUBRICANTS

LINCOLN

MAXIMUM DEMAND METERS

PROVEN INVALUABLE FOR TRANSFORMER SURVEYS



Low voltage or physical damage is the usual result of overloaded transformers. Both of these evils can be easily avoided through annual load surveys with Lincoln AD Meters. In addition, the accurate readings of these meters facilitate relocating (instead of replacing) existing transformers—thus affording appreciable savings.

Type AD Ampere Demand Meters measure maximum demand in amperes, the factor which determines the capacity of the distribution transformers required. They are exceptionally rugged and require no delicate handling. They may be installed and removed any time during the regular working day. Illustrated at the right are the AD meter and Form B Insulated Box conveniently arranged for hanging from pole crossarms.

See Type CCAO graphic illustrated below.

APPLICATIONS..

ON WHICH LINCOLN METERS SERVE BETTER

INDICATING WATT DEMAND

Type WDS Meters fit standard "S" sockets. For indoor or outdoor service.

RECORDING WATT DEMAND

Type CCW Watt Demand Meters. No contacts are required for their operation.

INDICATING AMPERE DEMAND

Type AD Switchboard Meters measure ampere demand on substation feeders.

RECORDING AMPERE DEMAND

Weatherproof Type CCAO records the demand on distribution transformers.

LINCOLN METER COMPANY

SPRINGFIELD, ILLINOIS

Several Million Dollars of Bids Called by Bonneville

Quickest possible expenditure of its $10,750,000 PWA grant seemed to occupy the collective minds of the Bonneville Administration last month. Bids were called and opened on several million dollars worth of towers, cables, etc.

Bids were opened Sept. 19 on more than 5,000,000 lb. of towers and supplemental steel for the Bonneville-Portland and Bonneville-Grand Coulee lines and on two 74,000-hp. turbines for the Bonneville power house. Low bid on the former was submitted by the American Bridge Co., asking $1,150,550. On the latter, S. Morgan Smith Co.'s bid of $1,584,144 was low.

Low bid for furnishing conductor cable and appurtenances for the Bonneville-Coulee transmission line was submitted by Aluminum Co. of America, asking $114,907.

Called were bids on 1,250,000 ft. of high-voltage cable, connectors and dead-end fittings for the Bonneville-Portland and Salem, Ore., line; on 215 towers and 680,000 ft. of conductor for the Vancouver, Wash.-Kelso, Wash., line; on 800 mi. of conductor, connectors and dead-end fittings for the Bonneville-Coulee line; and on 1,586,000 ft. of conductor, connectors and dead-end fittings for the Kelso-Aberdeen, Wash., line.

Survey work on the Bonneville-Coulee and the Vancouver-Eugene, Ore., line has already been started.

Meanwhile the City of Cascade Locks, Ore., moved to settle the problem posed when it contracted for 100 kw. of Bonneville power.

On Sept. 13 voters ballotted 141 to 16 in favor of a proposal to issue revenue bonds up to $90,000 in order to go into the power business. The issue was earmarked: $44,000 to be used for the purchase of the distribution system of the West Coast Power Co., now serving the city; $22,000 for extensions and improvements, and $12,000 for working capital.

Although newspapers in the territory freely intimated that the $44,000 price has been accepted by Peoples Light & Power Co., owner of the West Coast Co., no agreement to sell at this figure has been reached. Book value of the company's property is approximately $110,000, including a 250-kw. hydro plant on Herman Creek. J. D. Ross, Bonneville Administrator who has been advising the city on the problem, has suggested that $50,000 is a fair price for the property.

That the Cascade Locks situation is serving as a warning to some towns thinking about municipal ownership through purchase of Bonneville power

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is shown by the action of the Town of Stevenson, Wash., across the Columbia from Cascade Locks. There a report of a special committee of three citizens recommending that Stevenson go into the power business was tabled.

For other towns, however, the lure of public ownership seems strong. The Hillsboro, Ore., city council last month passed two resolutions looking toward the entry of the city into the power business. One resolution provided for negotiation of the purchase of Portland General Electric Co.'s Hillsboro system; the other was an application for Bonneville power.

●

Public Ownership Battles Thicken

With the November election drawing nearer, public ownership advocates have buckled down to the job of attempting to put over various propositions to harrass the privately owned utilities. As usual, the State of Washington is the focal point of these efforts.

Eighteen counties in the state have already formed power districts, and from ten to twelve more will vote next month. Those in which the question definitely is on the ballot are Clallam, Grays Harbor, Clark, King, Kitsap, Thurston, Yakima, Grant, Klickitat and Adams. Those in which it may be voted on include Pierce and Walla Walla.

Hot-bed of the public ownership fight is, however, Pacific County. There a petition has been filed asking dissolution of Public Utilities District No. 2 and requesting the county auditor to place the proposal for such dissolution on the November ballot.

The petition, signed by 2,429 qualified voters (more than the 2,383 favorable votes received when the district was formed in 1936), cites the activities of the three power commissioners as the chief cause of protest. Supposed to serve without pay, they allowed themselves approximately $3,000 for expenses up to July 31. This is about one-third of the amount spent for the same items by all the county districts now operating in the state.

Despite the strong feeling about the Pacific County district, however, no action is likely to be taken. State Attorney General G. W. Hamilton has ruled that the law governing creation of public utility districts made no provision for their dissolution and that Pacific voters could not ballot on such a question.

That this ruling is apt to stir up more trouble than the dissolution vote itself is an opinion easily reached.

Meanwhile an order directing issuance of a writ of review has been filed in the state supreme court in the case of the district vs. the Willapa Electric Co., facilities of which the district has sought to purchase for a rejected sum of $330,000. Application for the writ was filed by attorneys for the defendant. It held that the "respondents, who included Superior Court Judge John L. O'Phelan, had exceeded authority and jurisdiction and committed manifest error to the prejudice of the relators."

In California, 35 petitions calling for a special election for the formation of the Chico Municipal Utility District are being circulated. The district, which would embrace the towns of Chico, Durham, Paradise and rural areas, would be essentially the same as the Bidwell Municipal Utility District, ordered dissolved at a recent election.

●

PLANS FOR the sale of $1,000,000 of Seattle City Light bonds to carry on the department's $7,956,000 construction program have been announced by J. D. Ross, superintendent. Of the $1,000,000, $588,000 will be used to complete the amount of City Light funds required to make available PWA's $3.000,000 grant for the Skagit construction program. The remainder will be appropriated for extension of service within the city and other construction work.

●

Victoria Passes Law To Regulate Utilities

Bylaw providing for appointment of a standing public utilities committee with power to regulate in every respect Victoria, B. C., public utilities has been passed by the Victoria city council.

Under the law, the committee, consisting of the mayor and two members of the council, would have the power to determine a "fair rate of return upon prudent investment" and to order adjustment in rates charged in order to confine returns to a "fair rate." Given authority to enforce the rendering of "proper service," the committee would also be empowered to establish standards of construction and maintenance and to charge utilities such fees as were necessary to cover the cost of this regulatory and supervisory service.

The bylaw has been submitted to the B. C. Dept. of Municipal Affairs for approval.

●

FEDERAL POWER COMMISSION last month granted the Sacramento Valley Utility Co. an 18-mo. preliminary permit for the development of plans for a 12.000-kw. power plant on the Yuba River below the government's Upper Narrows debris storage dam. It was reported that the plant would furnish power to mining concerns in and near Nevada and Yuba Counties.

Seattle City Light Being Treated Unfairly, Ross Says

Declaring the Washington State Dept. of Public Service is unfriendly to Seattle City Light but "distinctly friendly" to Puget Sound Power & Light Co., J. D. Ross, superintendent of the former, last month took issue with a proposal to set up a joint state-city agency to regulate City Light's commercial lighting rates to apartment houses.

In a letter to the Seattle city council's utilities committee, Ross asserted the state has aided Puget Power against the city, accused the department of overlooking Puget Power's "unfair" practices and declared establishment of the agency would end City Light competition.

The state department proposed the board, stating it was necessary to end in Seattle the companies' practice of offering low commercial rates to apartment-house owners who rebilled to tenants at higher rates. Because the state has no regulatory power over public utilities, the agency cannot be established unless the council agrees to it. The council has passed a resolution, however, declaring its intention of cooperating with the state in the matter.

No final action has yet been taken.

●

POSTPONED until Oct. 3, when city officials were to act on a requested 20-per-cent wage increase, was a threatened strike by employees of the Centralia, Wash., city light department.

●

Bonneville Fish Ladders Called Successful

Harlen B. Holmes, aquatic biologist, last month announced the result of four-month's observation on the action of all species of fish traveling up or down stream in the Columbia River at Bonneville.

His conclusions were: (1) That the fish ladders at Bonneville are successfully passing the runs of fish upstream. (2) That the fish locks work satisfactorily, although they have not been needed to any extent this year. (3) That with the exception of a small peak-run of Chinook salmon in the early spring which did not materialize, the run this year is practically normal. (4) That the annual escapement of food fish to the spawning grounds above is smaller than generally supposed. (5) That the fish travel chiefly in daylight hours. (6) That complete information as to the downstream migration of fingerlings is lacking, but there is no evidence that they are being injured in passing the dam.

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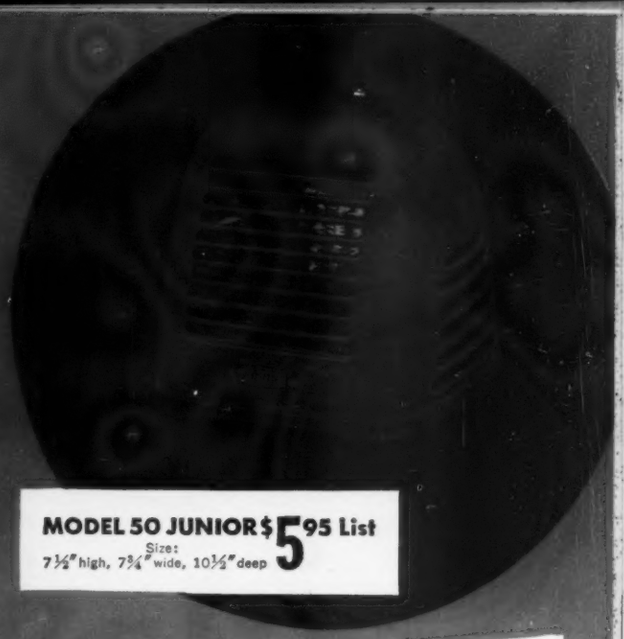

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Arvins sell in volume because widespread electrification has expanded the market. Owners of rural homes and city homes, camp cottages and trailers are all good prospects. Everyone likes the comfortable warmth Arvins provide—for baby's bath, shaving, dressing, drying hair and numerous other personal uses. You'll earn good profits selling Arvins this fall and winter. Order now from your jobber.

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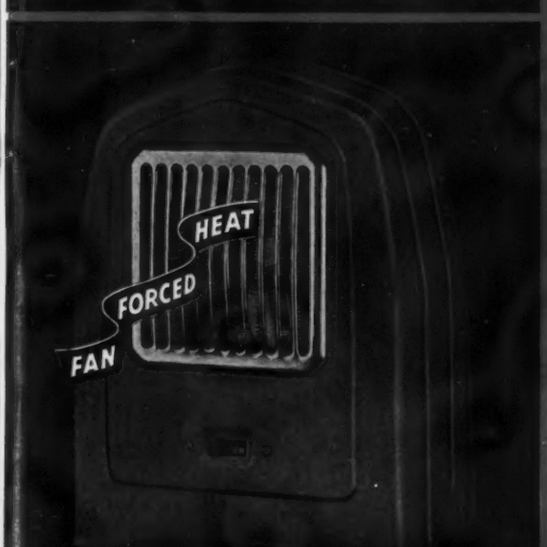

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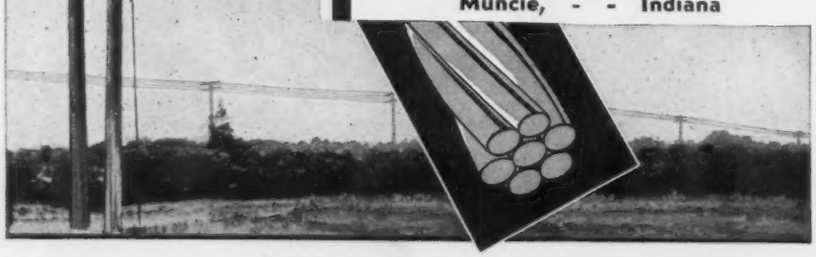
INDIANA STEEL & WIRE CO.
Muncie, - - Indiana



UTAH PUBLIC SERVICE COMMISSION last month ordered the Telluride Power Co. to reduce rates in Beaver, Garfield, Piute, Sevier, Sanpete and Millard Counties by more than $16,000 yearly. Effected are residential, commercial and church rates. The commission further ordered that "the company file with the commission a schedule for irrigation pumping, canceling the present flat-rate schedule and providing rates revised downward for users having an unfavorable load factor, effective for the 1939 irrigation pumping season." Extension of the period in which bills can be paid without penalty and reduction of the penalty were also ordered.

●

BRIEFS HAVE BEEN filed with the Federal Power Commission by the City of Los Angeles and Nevada-California Electric Corp. detailing their respective positions in a dispute over annual charges to be paid the power company by the city for use of its Boulder Dam-San Bernardino transmission lines.

●

MOTION OF the Federal Power Commission for a dismissal of the petition filed by Pacific Power & Light Co. for a review of the FPC order denying the consolidation of Inland Power & Light Co. with the Pacific company, has been denied by the U. S. Circuit Court of Appeals.

●

FIRST ILLUMINATING ENGINEERING SOCIETY convention to come to the Pacific Coast will be held in San Francisco Aug. 21-25, 1939. Such is the announcement of O. R. Doerr, San Francisco-Bay Cities Section, who heads local committees providing arrangements for the meeting. Part of the entertainment scheduled for next year will be an IES Day at the Golden Gate Exposition.

●

SUIT FOR $58,185 damages against the City of Los Angeles and the Bureau of Power & Light were filed in court last month by 84 property owners of South Gate and Huntington Park who claim that their radio reception has been ruined by leakage of the Boulder transmission line.

●

BONNERS FERRY, Ida., voters have authorized a $99,000 bond issue for the construction of a proposed $290,000 municipal power plant on the Moyie River. The municipality is seeking a grant from PWA.

●

PACIFIC DIVISION, National Electrical Wholesalers' Assn., will hold its 1938 fall meeting at Santa Barbara, Calif., Oct. 13-15. Several closed sessions and one open all-industry meeting have been scheduled on the program.

ON THE AIR *for Better Light...Better Sight*

THE G-E HOUR OF CHARM

★ *Dorothy Thompson*

LEADING LADY OF AMERICAN JOURNALISM

★ *Phil Spitalny*

AND HIS ALL-GIRL ORCHESTRA

★

Every Monday evening 9 to 9:30
E.S.T. Coast-to-coast N.B.C. Red
Network beginning October 3rd.

EVERY WIRED HOME will be a potential audience for this exciting new program. Together with G-E's fall Dealer-educational plan, backed by magazine and newspaper advertising, it will help promote Light Conditioning—Low cost of light, more and larger bulbs, I.E.S. lamps, as well as the broader aspects of Better Light-Better Sight.

EDISON MAZDA LAMPS

GENERAL ELECTRIC

Reliable
STRAIGHTLINE SPLICES
Copper Straightline Splice
Copper Straightline Reducer
Type A Copperweld Straightline Splice
Steel Straightline Splice
High in strength -- Low in cost -- Positive in performance. Ends fit wire closely, dampening vibrations and preventing insertion of improperly prepared wires. A husky slotted washer maintains spacing of jaws preventing a strand from wedging between them. Jaws grip wire positively without cutting lines in it.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE • CHICAGO ILLINOIS

REA Activities

FARMERS ELECTRIC MEMBERSHIP CORP., Clovis, N. M., has been allotted $106,000 to build 117 mi. of line in Curry and Quay Counties.

BENTON RURAL ELECTRIC ASSN., Prosser, Wash., has been allotted $54,500 to build 45 mi. of line in Benton and Yakima Counties.

LOWER VALLEY POWER & LIGHT CO., INC., Afton, Wyo., has been allotted $177,000, of which $106,000 will be used to build 113 mi. of line in Lincoln and Caribou Counties, Wyo., and Bonneville County, Ida. Balance will be used to increase facilities of generating plant and for other purposes.

BLACHLY-LANE COUNTY COOPERATIVE ELECTRIC ASSN., Blachly, Ore., has been allotted $10,000 to be used for additional customer connections and working capital.

ORCAS POWER & LIGHT CO., Eastsound, Wash., has been allotted $10,000, of which $2,000 will be used to complete existing construction, $8,000 for additional customer connections and extensions.

INLAND EMPIRE ELECTRIFICATION, INC., Spokane, has been allotted $310,000 to build 373 mi. of line in Spokane, Stevens and Whitman Counties, Wash.

WYRULEC CO., Lingle, Wyo., has been allotted $25,000 to be used for customer connections and working capital.

OVERTON (NEV.) POWER DISTRICT No. 5 has been allotted $5,000 to finance house-wiring and plumbing installations.

PLUMAS SIERRA RURAL ELECTRIFICATION COOPERATIVE, INC., Blairsden, Calif., has applied for an additional allotment of $125,000 to build 100 mi. of line in Plumas, Sierra and Lassen Counties.

IDAHO COUNTY LIGHT & POWER COOPERATIVE ASSN., Grangeville, Ida., has been allotted $191,000 to build 172 mi. of line in the county.

PARK COOPERATIVE ELECTRIC ASSN., Livingston, Mont., has been allotted $119,000 to build 98 mi. of line in Park County.

KOOTENAI COUNTY (IDA.) RURAL ELECTRIC ASSN. has been allotted $45,000 to build 31 mi. of line in the county.

JEFFERSON VALLEY RURAL ELECTRIC COOPERATIVE, INC., Whitehall, Mont., has been allotted $118,000 to build 105 mi. of line in Jefferson, Madison, Silver Bow and Beaverhead counties.

OREGON-WEST DOUGLAS POWER COOPERATIVE, Camas Valley, Ore., has been allotted $132,000 to build 110 mi. of line in Douglas County.

GARKANE POWER CO., Orderville, Utah, has been allotted $177,000 to build 118 mi. of line in Garfield and Kane Counties and a generating plant.

ALTONAH, MT. EMMONS & BLUEBELL ELECTRIFICATION COOPERATIVE, Altonah, Utah, has been allotted $74,000 to build 65 mi. of line in Duchesne County.

YELLOWSTONE VALLEY ELECTRIFICATION ASSN., Huntley, Mont., has awarded a contract for building 115 mi. of line in Yellowstone, Carbon and Stillwater Counties to D. M. Manning, Hysham, Mont., $97,022.

OVERTON (NEV.) POWER DISTRICT No. 5 has awarded a contract for building 93 mi. of line to Bennett & Taylor, Los Angeles, $143,173. Completion of the district's power line from Boulder City into the north county valleys was assured when an agreement was reached with the Lincoln County power district to transport the district's energy over the Pioche line 65 mi. to Sheep Mountain Junction. From there the district will construct a power line 24 mi. to Glendale.

LOWER VALLEY POWER & LIGHT COOPERATIVE, INC., has awarded a contract for constructing 150 mi. of line and a 600-kw. hydro plant to Bennett & Taylor, Los Angeles.

●

Contracts Awarded

TO FAIRBANKS-MORSE CONSTRUCTION CO., Chicago, for installing at La Junta, Colo., power plant and distribution system, including one 1,250-hp., one 1,000-hp. and one 750-hp. diesel generating units, $398,767.

TO ALTA ELECTRIC & MECHANICAL CO., San Francisco, for electrical work on new cottages at Sonoma State Home, Eldridge, Calif., $7,939.

TO NEPAGE MCKENNY, SEATTLE, for electrical work on pharmacy-chemistry building at University of Montana, $16,900.

TO PALMQUIST ELECTRIC CO., Helena, Mont., for electrical work on new hospital built by Sister of Charity, St. Mary's Academy, Helena.

TO VANCOTT CO., Los Angeles, for electrical work on nursery ward at state hospital, Spadra, Calif., $5,842.

BY BUREAU OF RECLAMATION to Puget Sound Machinery Depot, Seattle, for steel lining for 40 outlet conduits at Grand Coulee Dam, $208,585.

BY VANCOUVER, B. C., CITY COUNCIL to Hume & Rumble, Vancouver, for installing lighting system at Vancouver airport, $13,300.

BY LOS ANGELES DEPT. OF WATER & POWER to General Cable Co., Los Angeles, for 4,100,000 lin. ft. of overhead hollow-copper conductor for third Boulder transmission line, $1,223,275. To Phelps-Dodge Copper Products Co., Los Angeles, for black copper rod to be used for ground wire, $91,650.

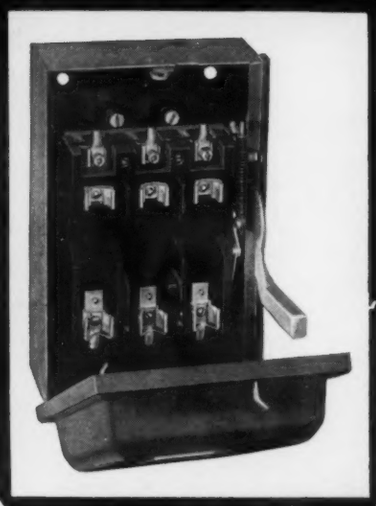
TO GUILBERT BROS., San Jose, Calif., for electrical work on hydrotherapy wings at California state hospital, Agnew, $5,726.

TO ELECTRIC CONSTRUCTION CO., Fresno, Calif., for electrical work on school auditorium, Coalinga, Calif., $21,156.

TO MOORE ELECTRIC CO., Los Angeles, for electrical work on custodial buildings at Pacific Colony, Spadra, Calif., $9,186.

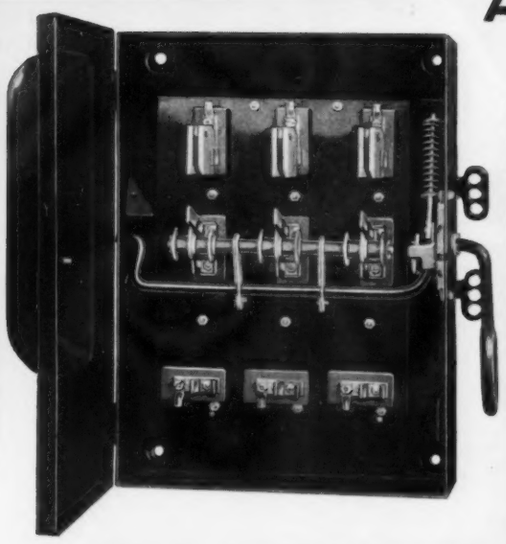
BY UNIVERSITY OF CALIFORNIA to Kerr & Clifford, Oakland, for electrical work on new enology building, Davis, Calif., $3,870. To York Ice Machine Co., San Francisco, for refrigeration, $6,750.

BY SEATTLE BOARD OF PUBLIC WORKS to Graybar Electric Co., Seattle, for three 196-kv. disconnecting switches for Seattle City Light's South receiving substation, $9,843.



"50,000" SERIES ☆ Heavy duty industrial type. Quick make, quick break. Elevated, removable base for wiring under interior. Interlocked cover. Double-break copper blades with reinforcing steel spring yokes for positive contact. Front operated. Compact, can be gang-mounted. 30-200 amperes.

SWITCHES FOR *Every* APPLICATION

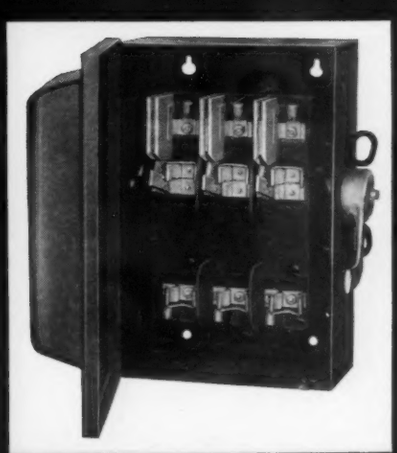


"80,000" SERIES ☆ Heavy duty industrial type. Quick make, quick break. Key controlled, interlocked cover. Unit base construction. Visible blades. 30-2400 amperes.

● **Modern industry's electric control requirements are many and varied. Yet, there is a Square D Industrial Safety Switch to meet every demand.**

For example, if a gang of switches must be mounted in a limited space, the "50,000" series, with compact boxes and front operation, fills the bill. If visible blades are required or larger sizes needed—it's the "80,000" series from 30 to 2400 amperes. When cover interlock and heavy duty construction are not needed, the "40,000" series is available.

All Square D Switches offer positive pressure fuse clips, high rupturing capacity and sturdy construction. Above all else, they are *dependable*.



"40,000" SERIES ☆ Enclosed industrial type. Quick make, quick break. Non-interlocked cover. 30-600 amperes. 30-60 amperes sizes have Square D swing-out interior for easier wiring.

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

CALL IN A SQUARE D MAN

BUILT FOR *top* PERFORMANCE ALWAYS

Because Gardner builds transformers right, they give long, trouble free service and economical operation. That is why the Research and Development Division of one of the world's largest oil companies chose Gardner. Shown above are 3—250 Kva., 12,000-126/218 volts and 3—100 Kva. 6900/11,950Y-460 volts Gardner Transformers built for this company. Write us to solve your problems.

Gardner Electric Manufacturing Co.
4227 Hollis St. Emeryville, Calif.

REPRESENTATIVES

Geo. E. Honn Co., 420 Market St., San Francisco, Calif.; Beeson Engineering Co., 2501 E. 52nd St., Los Angeles, Calif.; Industrial Electric Co., 1304 Stewart St., Seattle, Wash.; Modern Electric Co., 37 Richards St., Salt Lake City, Utah; Kranefeld Engineering Co., 3416 14th Ave., Denver, Colo.

GEO. E. HONN CO.

420 MARKET STREET SAN FRANCISCO, CALIF.

Gives Quick Service on Quality Products from Local Stocks

MANUFACTURERS' REPRESENTATIVES FOR:

PYREX INSULATORS
BREWER-TITCHENER HARDWARE
● Corning Glass Works

FUSES, CUTOUTS, DISCONNECTS, PROTECTIVE DEVICES
● Schweitzer & Conrad, Inc.

CAPACITORS
● Cornell-Dubilier Corp. World's Largest Exclusive Mfrs. of Capacitors

TRANSFORMERS
● Gardner Electric Mfg. Co. Power and Distribution Transformers
● Lee Skipwith & Co., Inc. Niagara Air-Insulated Current Transformers

CABLE GRIPS
● Kellems Products, Inc.

CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
● Jasper Blackburn Products Corp.

GROUND LINE POLE TREATMENT
● Osmose Corp. of America

METERING INSTRUMENTS
● Landis & Gyr, Inc.

CROMPTON TONG TEST AMMETER
● Columbia Electric Mfg. Co.

UNDERGROUND TOOLS AND EQUIPMENT
● T. J. Cope, Incorporated

TREE TRIMMING EQUIPMENT
● Bartlett Manufacturing Co.

FRICTION AND RUBBER TAPES
● Clifton Manufacturing Co.

Bids Called

By Bureau of Reclamation for three 150,000 hp. 120-r.p.m., vertical-shaft, hydraulic turbines and three oil-pressure, actuator-type governors for installation in the Grand Coulee power plant. Bids will be opened Oct. 17.

By Bureau of Reclamation for three 11,500-hp. 257-r.p.m., vertical-shaft, single-runner, Francis-type, hydraulic turbines; three oil-pressure, actuator-type governors; three 9,000-kva., 6,900-volt, 60-cycle, 90-per-cent power factor, 257-r.p.m., vertical-shaft, a.c. generators, each complete with direct-connected, main exciter and pilot exciter, thrust and guide bearings, for the Elephant Butte power plant, Rio Grand project, N. M.-Texas. Two 15,000-hp., 257-r.p.m., vertical-shaft, single runner, Francis-type, hydraulic turbines; two oil-pressure, actuator-type governors; two 12,000-kva., 6,900-volt, 60-cycle, 90-per-cent power factor, 257-r.p.m., vertical shaft, a.c. generators, each complete with direct-connected, main exciter and pilot exciter, thrust and guide bearings for the Green Mountain power plant, Colorado-Big Thompson project. Bids will be opened Oct. 10.

By Bureau of Reclamation for two 115,000- to 115-volt, 60-cycle, outdoor, oil-immersed, potential transformers; two 20/150-amp, 60-cycle, 115,000-volt, outdoor, oil-immersed, current transformers; one 115,000-volt, 600-amp., three-phase, oil circuit breaker; three 138,000-volt, three-pole, manually gang-operated, disconnecting switches; six 138,000-volt, single-pole, hook-stick-operated, disconnecting switches for the Dillon substation; and four 1,000-kva., 60-cycle, 66,400/115,000 Y- to 2,300-volt, self-cooled, single-phase, transformers; one 138,000-volt, three-pole, manually gang-operated, disconnecting switch; one 115,000-volt, three-pole lightning arrestor for the Green Mountain substation, Colorado-Big Thompson project. Bids were to be opened Oct. 5.

ABOUT PEOPLE

John Harisberger Retires From Puget Sound Power

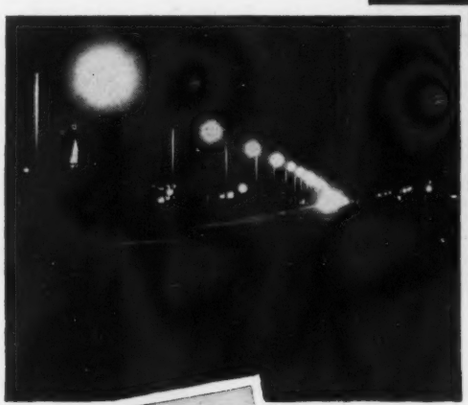
John Harisberger, general superintendent of Puget Sound Power & Light Co.'s division of power supply, last month retired from active duty after a service of 40 years with the utility and its predecessors. Announcement of the retirement, together with a number of other changes, was made by Leslie R. Coffin, vice-president.

A pioneer electrical engineer of the Pacific Northwest, Harisberger helped build the Snoqualmie Falls power plant and, on completion, became its first superintendent. His vision also contributed to the building of practically all other Puget Power plants and inter-connections of transmission and substation facilities.

A man of wide interests, he was a lecturer on generation and transmission of electric power at the University of Washington from 1905 to 1911. He

CLEVELAND ADDS WESTINGHOUSE VISIBILITY SYSTEM *To Cut Night Traffic Deaths!*

The New Cleveland Lake Shore Boulevard after the Westinghouse "visibility system" had been installed. Below is the same thoroughfare before the installation of Reflectolux units.



Reflectolux Jr.—designed for circuits up to 3,500 volts and lamps up to 500 watts or 10,000 lumens.

Cleveland early this year began an intensive traffic safety and accident prevention program which successfully reduced fatalities 50 per cent. However, **night traffic deaths** were not reduced in ratio to the day fatality reduction — one fatality after another occurred on streets where poor visibility prevailed.

To match night driving visibility with modern driving speeds, a scientifically designed street lighting system with Westinghouse Reflectolux Jr. luminaires was installed along the new Lake Shore Boulevard as the first check against night traffic deaths.

Westinghouse Reflectolux units are designed to provide adequate brightness on the street surface . . . a surface that is in effect a lighted background for every obstruction in the driver's path. It is possible for the driver to see hazards far enough ahead in time to avoid them. Reflectolux offers more light, less maintenance, greater flexibility and durability than any comparable street lighting luminaire.

For complete details, ask your local Westinghouse Lighting Specialist for the book, SAFETY WITH LIGHT. Or, address Westinghouse Electric & Manufacturing Company, Lighting Division, Edgewater Park, Cleveland, Ohio.

WHEN YOU THINK OF *Lighting Equipment* THINK OF

Westinghouse

was a member of the advisory board for the University's department of electrical engineering from 1916 to 1919. During the World War he was commissioned a captain of engineers. He is listed as a charter member of the AIEE.

Succeeding Harisberger is George C. Sears, an employee of Puget Power since 1902 and latterly superintendent of power plants and transmission lines. Edward W. Conroy, assistant to the general superintendent of light and power, has been named superintendent of transmission under Sears.

Other changes include the transfer of L. C. McIver, assistant to Coffin, to the general offices as assistant to Vice-President S. P. McFadden. R. W. Joyce, local manager for the power company

JOHN HARISBERGER

at Auburn, Wash., succeeds McIver. Henry B. Hardin, distribution engineer, takes over Conroy's position. L. O. Spickard moves from Puyallup into the Auburn vacancy. A. M. McDonald, general foreman of the company's western division, succeeds Spickard and is himself succeeded by H. A. Eagon, formerly of Everett.

●

WESTERNERS who won prizes in the $200,000 award program sponsored by the James F. Lincoln Arc Welding Foundation for the best papers on arc welding included: Fred S. Beach, Northwestern Electric Co.—second prize in the automotive classification; Arnold A. Seipel, Bureau of Reclamation, Denver—first prize in the containers classification; Alfred E. Bratfisch, Los Angeles Dept. of Water & Power—fourth prize in the containers (contents moving) classification, and L. H. Parker and F. C. Stagg, Turlock (Calif.) Irrigation District—fourth prize in the functional machinery (prime movers) classification.

PAUL P. ASHWORTH, formerly of Utah Power & Light Co.'s engineering department in Salt Lake City, has been named assistant to General Manager H. B. Waters of the Telluride Power Co., Richfield, Utah. Ashworth started his electrical engineering career with the Telluride company in 1906. Later he was involved in developmental work in Colorado, designed and constructed hydroelectric plants and distribution systems at Boise, Ida., and Casper, Wyo., and progressed from operator to general superintendent of electrical construction for Utah Power.

●

CLYDE L. CHAMBLAIN, California Electric Construction Co., San Francisco, and past president of the National Electrical Contractors' Assn., has been elected vice-chairman of the NECA's new labor relations committee. According to Chamblain, who represented Division 9 at the NECA convention in Detroit, Sept. 12-13, the committee will soon hold conferences with national officers of the International Brotherhood of Electrical Workers.

●

JACOB A. KAHN, Salt Lake City district manager of General Electric Supply Corp., has been elected a director of the Continental National Bank & Trust Co., Salt Lake City.

●

J. P. MARTIN, U. S. Forest Service's chief engineer in the intermountain region, has been appointed to conduct field studies and investigations for the Federal Power Commission. He will make surveys involving power developments and related flood control.

●

FRANK B. WILLIAMS, JR., vice-president and sales manager of the Diehl Mfg. Co., has been elected vice-president in charge of the merchandising division of Westinghouse Electric & Mfg. Co. He succeeds Arthur E. Allen who has resigned.

●

Muffley Reelected Head of Washington Electric Club

Ray U. Muffley, Puget Sound Power & Light Co., has been reelected president of the Electric Club of Washington.

Dan U. Chamberlin, Globe Electric Co,. Seattle, is first vice-president. W. M. Humason, Western Union Telegraph Co., is second vice-president; W. H. Flood, Puget Power, secretary, and Charles W. Allison, Puget Power, treasurer.

J. J. Agutter, J. J. Agutter Co.; James Ferguson, Seattle City Light, and Joe R. Wells, Westinghouse Electric Supply Co., have been elected trustees.

Rarely does Westinghouse Electric & Mfg. Co. present the Silver "W" Award of Merit to any employee outside of those directly connected with manufacturing operations in the east. Outstanding, therefore, was the presentation of the Silver "W" to A. W. Copley, Pacific Coast engineering manager, in recognition of his ability as an engineer, his contributions to the larger engineering projects of the West and his encouragement of younger engineers. To officiate at the ceremony, Vice-President Ralph Kelly (right) made a special trip from East Pittsburgh

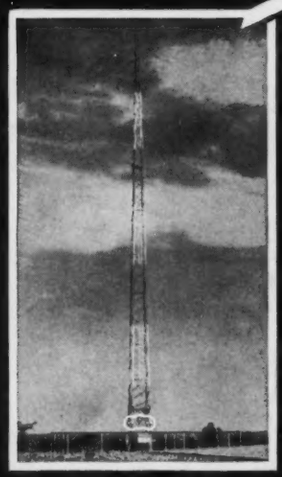
Cranston Honored by S. F. Electrical League

James A. Cranston, retired commercial vice-president of General Electric Co., last month became the fourth man to be awarded an honorary life membership in the San Francisco Electrical Development League. The award was made at a luncheon meeting before 218 leaders of the industry.

The spirit which motivated the occasion was described in a letter from Owen D. Young, G. E. chairman of the board: "In these days when so many meetings are held to save the industry and to save our country, it is heartening, on rare occasions, to honor men who made the industry and so help make the country."

Chairman of the day was P. M. Downing, vice-president of Pacific Gas and Electric Co. O. B. Coldwell, vice-president and general manager of Portland General Electric Co., was speaker. He characterized Cranston's career as synonymous with the history of electrifying the Pacific slope.

Honor guests at the meeting included James H. McGraw, founder of McGraw-Hill Publishing Co.; James B. Black, P.G. & E. president; James Henderson, president of Hilo Electric Co., Hawaii; R. W. Turnbull, vice-president and general manager, Edison G. E. Appliance Co., Chicago, and R. E. Fisher, P.G. & E. vice-president in charge of public relations and sales.



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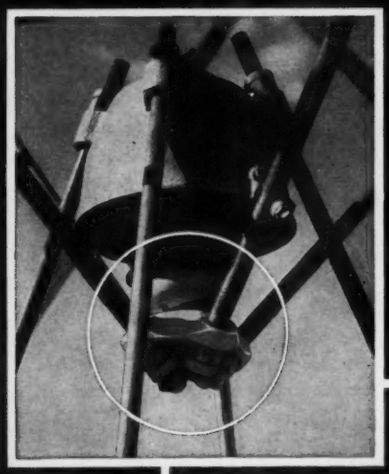
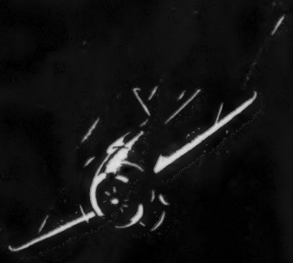
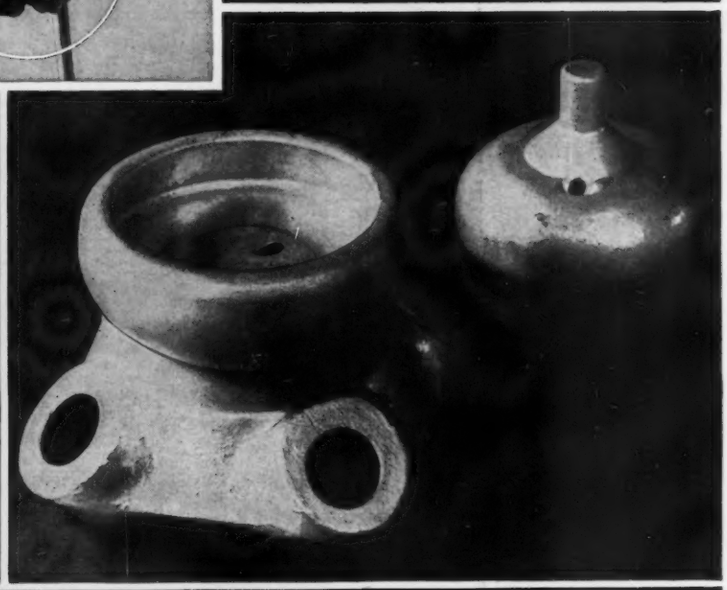




RADIO BEACON TOWER HARDWARE . . .

Follow the circle. This hardware was forged to specification. It is the new beacon at the Amboy Airport, Syracuse, New York and just completed. We leave it to the engineer to imagine the strain put on this hardware in the bracing of this tower.



FORGED by B.T.C.

THROUGH YOUR INSULATOR MANUFACTURER ONLY

IF IT'S HI-LINE HARDWARE, B. T. C. CAN FORGE IT

THE BREWER-TITCHENER CORPORATION, CORTLAND, NEW YORK

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

★ Automatic MIXMASTER ★ Double-Automatic IRONMASTER ★ Silent AUTOMATIC TOASTER ★ AUTOMATIC COFFEEMASTER ★ WET-PROOF HEATING PAD ★ MASTER CORD and PLUG SET ★ GLASS COFFEE MAKERS ★ FANHEATER ★ FLAT TOASTER ★ SHAVEMASTER.

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CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Ill.
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224 S. W. Temple St., Salt Lake City, Utah
47 YEARS MAKING QUALITY PRODUCTS

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Just ask for Booklet M-3

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

RICHARD STEPHENS, Pacific Gas and Electric Co., has been named chairman of the membership committee of the San Francisco Chamber of Commerce's new construction industry section. Also connected with the chamber section are Robert Hudson, Hunter & Hudson, representing the Electrical Development League; L. M. Lethine, Anaconda Wire & Cable Co., and G. A. Trosper, P.G. & E. The new department, an outgrowth of the "Shine for '39" movement, is designed to create more construction business, protect the construction industry in legislative matters, coordinate sources of statistics and information and distribute leads on new business among members.

●

W. J. BERRYMAN, Mine & Smelter Supply Co., Salt Lake City, was general chairman of the Electrical League of Utah's eighteenth annual outing.

●

GENE N. HENDERSON, Seattle, was first-prize winner in a country-wide modernization contest conducted among radio service engineers and dealers by RCA Mfg. Co.

●

STANLEY JOSEPH has been named general chairman of the fall appliance exposition to be held by the Gas & Electric Appliance Society of Sacramento, Calif., Oct. 19-21. Joseph's committee includes Harry L. Wood, W. F. Lang, Walter J. McLaughlin, Harold Dixon, John B. Hawley, Howard M. Marx and James F. Purcell.

●

"DUKE" MUDD has been named sales manager of Howell Electric, Inc., Reno contractor-dealer establishment.

●

R. H. SNETSINGER has been appointed manager of the new Victoria store opened by Goblin Electric Cleaner & Engineering Co.

●

CLARENCE TUBBS, Brown-Johnston Co., Spokane, was winner of the $50 prize awarded monthly to the distributor salesman who has the best Norge promotion and selling plan.

●

GEORGE KELLEY, dealer representative for Portland General Electric Co., won the $100 prize in the 1938 Lindeman-Edison Institute Electric cookery contest.

●

FRANK BARRETT, formerly salesman for Crawford electric ranges, has joined the Ray Segurson Electric Co., Portland.

●

WILLIAM COVER, George Belsey Co., Los Angeles, was winner of the *Better Homes & Gardens* contest for the best designed new or revamped kitchen.

E. C. HUERKAMP, Westinghouse Electric & Mfg. Co.'s sales manager of commercial, industrial and flood lighting, and Walter M. Hutchinson, sales promotion manager, both of Cleveland, were in charge of a lighting demonstration and show presented throughout the West last month. The manufacturer's local staffs and wholesalers assisted in staging the show.

●

L. E. BALDWIN, formerly head of Utah Power & Light Co.'s dealer coordination department, now heads the new electric appliance department of Auerbach's Department Store, Salt Lake City. Plans for enlarged department are under way.

●

GEORGE M. WOLF has joined Smoot-Holman Co. He will report to the San Francisco office from his headquarters in Fresno, Calif.

●

Deaths

JOHN B. CARTER, 71, retired agricultural sales engineer and former district manager of the Corcoran and Taft districts of San Joaquin Light & Power Corp., died in San Francisco. Going to Fresno from San Francisco in 1902, Mr. Carter went to work as a street-car conductor for the Fresno Traction Co., then operated by San Joaquin Power. In 1909 he became the first power salesman for the utility. Two years later he opened the first district office in Taft, and seven years after that he became district manager at Corcoran. In 1923 he was moved into the general offices at Fresno as power salesman, the post he held at the time of his retirement last year.

●

G. F. BENHAM, assistant to the general superintendent of the San Francisco and East Bay division of Pacific Gas and Electric Co., died in San Francisco Sept. 12. A native of Montana, Mr. Benham was a graduate electrical engineer from the University of Minnesota. He began work with Great Western Power Co. in 1913 and was assistant to the general superintendent at the time of merger of those properties with P. G. & E.

●

THEODORE C. BOSLEY, efficiency engineer for the B. C. Electric Railway Co. and general manager of B. C. Transportation, Ltd., Vancouver, died of heart attack last month. Born in Youngstown, Ohio, he joined the Seattle Electric Co. in 1909. In 1911 he came to the B. C. company as material and records clerk. He was appointed efficiency engineer in 1915; general manager of transportation in 1932.

Speakers

.H. B. May, Jr., General Electric street lighting specialist, Los Angeles: "Lighting as a Safety Factor"—at meeting of California Municipal Utilities Assn..

At the 1938 Lighting Forum presented by the Western Institute of Light & Vision in the Edison Bldg., Los Angeles—Sept. 26, Arthur E. Hoare, optometrist: "Light and Sight;" W. H. Robinson, Jr., General Electric Co.: "Light Sources." Oct. 3, Arthur W. Nye, head of University of Southern California physics department: "The Control of Light;" Frank Anderson, Westinghouse Lamp Co., and Walter A. Alden, Westinghouse Supply Co.: "Lighting Installation Design." Oct. 10, Richard A. Buckby, General Electric Co.: "Home Illumination;" George M. Rankin, Southern California Edison Co.: "New Lighting Developments." Oct. 17, Frank Van Gilluwe, Holophane Co.: "Lighting for Inspection;" Horace L. White, Crouse Hinds Co.: "Floodlighting Design." Oct. 24, Thomas A. Clarke, Libby-Owens-Ford Co.: "Modern Store Fronts;" H. C. McClellan, North American Chemical & Paint Co.: "Paint & Light." Oct. 31, M. Walter Burbank, consultant in display designs; "Display Lighting;" Theodore H. Shepherd, Los Angeles Bureau of Power & Light: "Lighting Service."

At the 1938 Lighting Forum for the Orange Belt Cities—Oct. 13 at Pomona, Calif., Dr. W. M. Gardner, Los Angeles Board of Education: "The Miracle of Sight;" Alston Rodgers, General Electric Co.: "Light Sources." Oct. 20 at San Bernardino, Calif., Arthur W. Nye: "The Language of Lighting;" Frank T. Anderson and Walter A. Alden: "Lighting Installation Design." Oct. 27 at Riverside, Calif., James W. Meyberg, Meyberg Co.: "Residential Lighting;" F. B. Nightengale, Kim Mfg. Co.: "Garden Lighting." Nov. 3 at Pomona, Frank Van Gilluwe: "Industrial Lighting;" Arthur M. Johnson, S & M Lamp Co.: "Outdoor Illumination." Nov. 10 at San Bernardino, Foster K. Sampson, Southern California Edison Co.: "School Lighting;" George M. Rankin: "Commercial Lighting." Nov. 17 at Riverside, Lloyd A. Gates, Los Angeles Bureau of Power & Light: "New Lighting Developments;" Victor W. Hartley, PCEA: "Adequate and Flexible Wiring."

At Residential Lighting Forum in Los Angeles Bureau of Power & Light Bldg. —Oct. 14, Harry M. Goodman, optometrist: "How We See;" Alston Rodgers: "Light Sources." Oct. 21, Lloyd A. Gates: "Illumination Terms;" Frank A. Hansen, director, Western Institute of Light & Vision: "Control of Light." Oct. 28, Richard A. Buckby: "Decorative Home Lighting." Nov. 4, Foster K. Sampson: "Architectural Lighting Treatments." Nov. 11, Walter L. Stickel, Electrical Development League: "Adequate and Flexible Home Wiring;"

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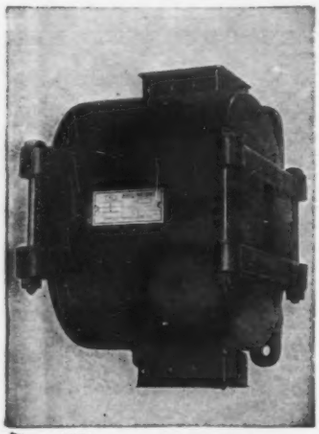

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R. H. Manahan, Los Angeles inspection department: "Lighting Ordinances;" Herbert G. Ufer, Underwriters' Laboratories: "Underwriters' Requirements." Nov. 18, Richard A. Buckby: "Selling Illumination;" Theodore H. Shepherd: "Utility and Industry Cooperation."

Dr. Phillips Thomas, Westinghouse research engineer: New ways of putting electricity to work—in a public lecture in Salt Lake City.

Leo Giannini, illuminating engineer, General Electric Co., San Francisco: value of fluorescent Mazda lighting in bringing out true colors in merchants' displays — at the Western Furniture Exchange, San Francisco.

F. H. Harrigan, National Kitchen Bureau: value of kitchen planning—before the Adequate Wiring Assn., Spokane. R. J. Franks, Maxwell & Franks, presided.

At a series of sales meetings held throughout Idaho Power Co.'s territory—Ralph E. Gale, commercial manager; F. M. Ingraham, residential sales manager; Orland C. Mayer, commercial and industrial sales manager; G. L. Stanton, advertising manager; Helen Swanson, home service director, all of the power company; Don Pierson, General Electric Co., Butte, Mont.; T. W. Kaylor, Westinghouse Supply Co., Salt Lake City; R. S. Belnap, General Electric Supply Corp., Boise, Ida.; E. V. Anderson, Hotpoint, Boise; J. H. Jackson, Hotpoint, Boise; A. B. Darbey, Thor representative for Hurley Machine Co., and Erwin Fryer, Colonial Premier Lamp Co., Chicago.

C. M. Hoag, electrical engineer, Union Oil Co.: "Power Factor and Its Correction"—at the Sept. 20 meeting of the Electrical Maintenance Engineers' Assn. of Southern California.

At an Electrical League of Utah meeting in Salt Lake City — Hyde Staynor, superintendent of Utah Power & Light Co.'s meter department: individual provisions of the new adequate wiring specifications. G. W. Forsberg, Wasatch Electric Co. and vice-president of the league, presided.

TRADE NOTES

DRIVER-HARRIS Co. has announced that two new stocks of Nichrome and other electrical alloys are now available on the Pacific Coast through the Electrical Specialty Co. of Southern California, Los Angeles, and the Electrical Specialty Co., Seattle.

●

BROWN-JOHNSTON Co., Spokane, won the G.E. prize for lamp bulb contracts made from February through May.

RORERTS, ASHWORTH & HEWES, INC., is a new Salt Lake City store which will handle air-conditioning and ventilating systems in conjunction with appliances. The store was formed by the consolidation of Ashworth Appliance Co., owned by T. E. Ashworth, and the business of W. A. Roberts and George C. Hewes, heating and air-conditioning engineers.

●

RADIO STUDIOS, INC., Salt Lake City, has been named intermountain distributor for Stromberg-Carlson Radios.

●

ALTON B. FOUTZ has purchased Radio Engineering & Service Co., Butte, Mont., from his former partner, Buster Froelich.

●

AMERICAN LAVA CORP. has acquired all equipment of the American Ceramics & Specialties Corp. and will move this to its laboratory at Chattanooga, Tenn.

●

FRANK'S MOTOR SERVICE, Omak, Wash., has taken on the Norge line of ranges, refrigerators, washers and ironers.

●

W. F. ABERCROMBIE has opened an appliance store in Lewiston, Ida. He handles Stewart-Warner refrigerators, Dexter washers and ironers, etc.

●

CONDON & YOUNG, INC., manufacturers' representatives, have taken over southern California-Arizona representation of wires and cables for U. S. Rubber Products, Inc. They will operate through the company.

●

BUY-RITE STORE, Almira, Wash., has opened an appliance department carrying Maytag major appliances, Zenith radios and all small, standard-make appliances.

●

MODERN UTILITIES Co. has been purchased by the C. C. Anderson Co., owner of the Golden Rule store, all three of Lewiston, Ida., and its entire stock of electrical appliances moved into the Golden Rule's new electrical department. Tom Tabor, former Modern Utilities owner, is manager of the department.

●

MOVED

ELECTRICAL SMITH, Spokane appliance and contracting establishment, from 180 S. Howard to 121 E. Sprague.

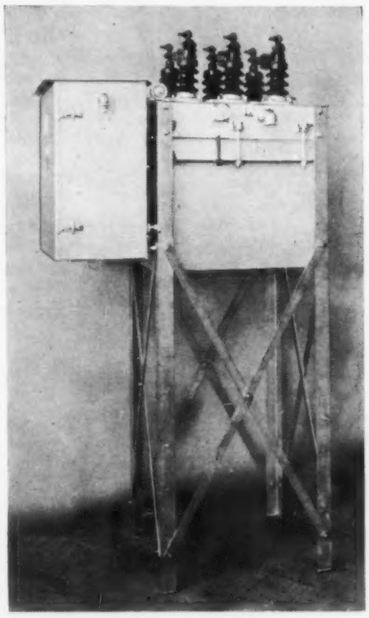
PACIFIC POWER & LIGHT Co. and Idaho Power Co. into new local offices in Enterprise, Ore., and Aberdeen, Ida., respectively.

TURNER ELECTRIC Co., Los Angeles, from 129 S. Vermont to 1054 S. Vermont.

NEW PRODUCTS

Oil Circuit Breaker

Principles of design incorporated in larger oil circuit breakers manufactured by Pacific Electric Mfg. Co. are provided in a new 7.5-15-kv., 600-amp. breaker. The breaker's motor-control will operate on a.c. without rectifiers



because a motor-wound, spring-operated mechanism eliminates complicated circuits and the use of batteries for closing the breaker. The breaker may also be supplied to operate on low-voltage d.c. The company claims that with this unit all phases interrupt in one tank, thus saving space and oil.

●

Troubleman's Light

For use by troublemen or linemen is a duplex light manufactured by Carpenter Mfg. Co. The light weighs 7½ lb., uses two No. 6 telephone-type dry cells and contains both search and floodlamps for pole and ground service. The searchlight projects a 25,000-cp. beam up to ¼ mi. and is especially adapted to spotting conditions on crossarms in that it throws a beam 10 ft. in diameter on 40-ft. poles. The ground light serves an area 20-ft. in diameter. A single, two-way toggle switch controls the lamps. Lenses are shatter-proof. A tie-up bracket makes it possible to aim light at any angle.

●

Appliance-Cord Plug

New "Handy" plug introduced by the Albany Sales Co. makes possible simple connections with a minimum of work. Outlet for wire is on side; connections are made through teeth staggered to provide eight contacts. The company's directions for use of the plug say to separate wires for one inch, remove all insulation down to the rubber insulation but do not remove that. Insert wires through outlet and lay them in grooves directly over points. Then screw on cap as tight as possible. The plug, so it is said, eliminates use of tools, loss of screws and loose connections.

Coffee Makers

Newcomer in the coffee-maker field is Chicago Flexible Shaft Co. with its automatic, vacuum-type, unbreakable, 8-cup Sunbeam Coffeemaster. The company says that the appliance automatically governs the rise of water to the brew-top at the correct fixed temperature, agitates the coffee for the correct brewing period, automatically times the return of the coffee to the server below and then automatically changes the heat to keep the coffee hot. The Coffeemaster will sell for $15 . . . At the same time the Silex Co. announces an innovation—an upper bowl handle now furnished on all Silex coffee makers. The handle is said to make easy the removal and seating of the upper bowl.

CLASSIFIED SECTION

● COST of undisplayed classified ads is 5 cents a word, minimum $1.00 insertion. Box numbers in care of our San Francisco office count as 10 words additional in undisplayed ads. ● RATES per column inch of displayed ads is $3.75. ● All classified ads are payable in advance.

HELP WANTED

Sales Engineer to take charge of District Office on Pacific Coast of large manufacturer selling nationally. Age between 33 and 40 years. Must be electrical engineering graduate. Give age, education, experience, references first letter. Replies treated confidential. Box W86, Electrical West, 833 Mission St., San Francisco.

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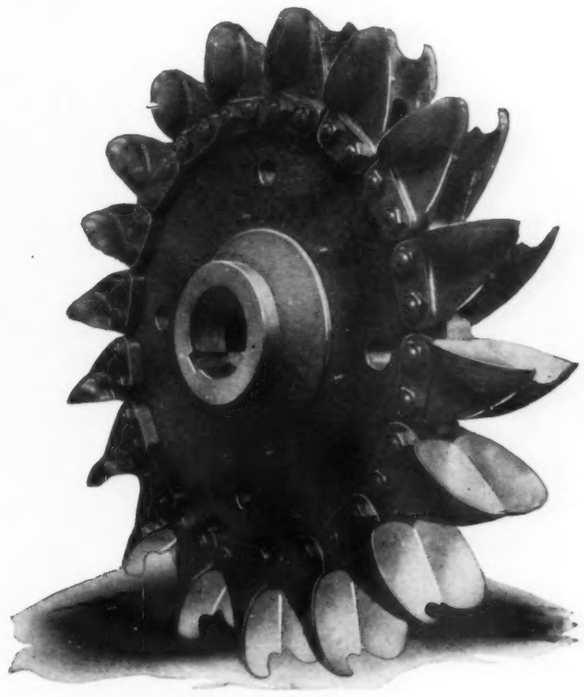

TAKEN on the average the cost of new hydraulic equipment may be from 3 to 5 per cent of total development costs, and yet the performance of these mechanical units determines, to a marked degree, the ultimate success of the project.

Regardless of contemplated developments, logic suggests a careful analysis of the older plants . . . to determine the possibilities for increased capacity from existing water supply. Many of the older plants have been modernized at comparatively small cost, resulting in increased output with greater reliability and safety. Ask Pelton engineers for specific proof.

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PRODUCT DATA

Free to you . . . Any of these instructive bulletins simply by addressing a post card to ELECTRICAL WEST and asking for the desired bulletin by number.

1001:
COMBINATION WATTHOUR METERS and time switches for metering or controlling either two-rate or off-peak domestic loads are described in an 8-page leaflet by Westinghouse. The company claims that elimination of separate time-switch units plus the simplicity of mounting make possible important economies in this class of metering and control.

1002:
OF ESPECIAL INTEREST to the communication engineer of a power company is Copperweld Steel Co.'s bulletin on telephone lines for overhead communication circuits. The company's contention that the conductor can be strung in longer spans with greater safety and less weight per mile is illustrated in charts and tables.

1003:
TWO NEW FOLDERS by Carrier Corp. cover details of commercial refrigeration and diffusion of low-temperature air conditioning. The range of condensing units from ¼ to 50 hp. is covered with specifications for the various sizes. The cold diffusers are said to deliver from 200 to 11,000 cu. ft. per minute.

1004:
POLYPHASE POWER-DIRECTIONAL RELAYS for protection of transmission lines are described and illustrated in General Electric bulletin GEA-2827. The relays, which utilize the induction-cylinder principle of design, feature trouble-free operation, low maintenance, better protection for equipment, low installation cost, compactness and attractive appearance.

1005:
RAILLEY CORP.'s fifth anniversary catalog is a 20-page review of pin-it-up lamps. Catalog illustrates and briefly describes the company's 1938 line. Also covered is promotional material to be used in telling the pin-it-up story to the public.

1006:
"AIR-OPERATED COMBUSTION CONTROL" is the title of a 32-page pamphlet by Bailey Motor Co. Besides describing the various elements of the control system, the bulletin explains fundamental principles involved in controls, both for boilers fired with stokers and for those fired with fuels in suspension.

1007:
"THE NEW METHOD OF CIRCUIT WIRING" is a dynamic booklet published by National Electric Products Corp. in behalf of its plug-in strip. Says the company: "There is no known method except 'plug-in' strip to adequately and properly rewire 25,000,000 homes in the U. S. without damage to walls."

1008:
IF YOU OR YOUR CUSTOMERS have a stockbin illumination problem, Goodrich Electric Co.'s 12-page bulletin may be of assistance. Fully illustrated and complete with engineering data, the bulletin shows many examples of how the problem of narrow-aisle illumination has been solved through use of the company's lights.

1009:
RELAYS OF TEN different types are illustrated and briefly described in Advance Electric Co.'s latest catalog. The booklet points out that in all Advance relays for a.c. operation there has been incorporated an improvement which eliminates hum, chatter, etc.

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Norge Division, Borg-Warner Corp.

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Weston Elec. Instr. Corp.

Anchor and Guy Rods
A. B. Chance Co.
General Elec. Co.
Hubard & Co.
Maydwell & Hartzell, Inc.

Anchors, Guy
A. B. Chance Co.
Everstick Anchor Co.
Hubbard & Co.
James R. Kearney Corp.
W. N. Matthews Corp.

Appliances, Household
Apex-Rotarex Mfg. Co.
Chicago Flexible Shaft Co.
Clements Mfg. Co.
Easy Washing Machine Corp.
Edison General Elec. Appliance Co., Inc.
Frigidaire Division
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Division
Landers, Frary & Clark
Leonard Division
Malleable Iron Range Co.
National Enameling & Stamping Co.
Noblitt-Sparks Industries, Inc.
Standard Elec. Mfg. Corp.
The Silex Co.
Utility Electric Co.
Wesix Elec. Heater Co.
Westinghouse Elec. & Mfg. Co.

Boxes
General Cable Corp.
General Elec. Co.
Superior Switchboard & Devices Co.
Westinghouse Elec. & Mfg. Co.

Brackets, Wood
Locust Pin Co.

Breakers
Air Circuit Breakers
Electric Material Co.
General Elec. Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Oil Circuit Breakers
Allis-Chalmers Mfg. Co.
Electric Material Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Buses
Aluminum Co. of America

Bushings
General Elec. Co.
Graybar Electric Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
Ohio Brass Company
Westinghouse Elec. & Mfg. Co.

Cable Accessories
General Cable Corp.
General Elec. Co.
James R. Kearney Corp.
John A. Roebling's Sons Co.

Cable, Armored
American Steel & Wire Co.
General Electric Co.
Hazard Ins. Wire Works
Okonite Company
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Wiremold Company

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Copperweld Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Hazard Ins. Wire Works
Indiana Steel & Wire Co.
Marwood Limited
Maydwell & Hartzell, Inc.
The Okonite Co.
Okonite-Callender Cable Co.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Triangle Conduit & Cable Co., Inc.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Carbon Products
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Chimes
Square D Co.

Clamps, Ground
Copperweld Steel Co.
B. Hartman
Reliable Elec. Co.

Coffee Makers
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Conduit
Aluminum Co. of America
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Triangle Conduit & Cable Co., Inc.
Walker Brothers
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Conduit, Flexible Metallic
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Triangle Conduit & Cable Co., Inc.
Wiremold Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Reliable Elec. Co.
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Controllers
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General Elec. Co.
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Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

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General Elec. Co.
Wagner Elec. Corp.
Westinghouse Elec. & Mfg. Co.

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Fittings, Conduit
General Elec. Co.
B. Hartman

Fittings, Insulator
Brewer-Titchener Corp.
Graybar Electric Co.
Ohio Brass Company

Fixtures, Lighting
Benjamin Elec. Mfg. Co.
Curtis Lighting, Inc.
General Elec. Co.
Pittsburgh Reflector Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.

Floodlighting
Curtis Lighting, Inc.
General Elec. Co.
Pittsburgh Reflector Co.
S & M Lamp Co., Inc.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Ground Rods
Copperweld Steel Co.
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Noblitt-Sparks Industries, Inc.
Wesix Elec. Heater Co.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
The Electric Heater Co.
Standard Elec. Mfg. Corp.
Wesix Elec. Heater Co.
Westinghouse Elec. & Mfg. Co.

Heating Element—Repair Part
Montgomery Bros.
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See Ammeters, Voltmeters, Wattmeters.

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Insulators
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Lamps, I.E.S.
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Lamps, Mazda
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Lamps, Sun
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Lighting Equipment
Benjamin Elec. Mfg. Co.
Curtis Lighting, Inc.
Keese Eng'g Corp.
Kim Mfg. Co.
Smoot-Holman Co.
H. B. Squires Co.
Sterling Reflector Co.
Westinghouse Elec. & Mfg. Co.
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Line Material
Hubbard and Company
Maydwell & Hartzell, Inc.
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Meters
General Elec. Co.
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Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.
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Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Wagner Elec. Corp.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Shell Oil Co.
The Texas Co.

Oil, Transformer & Switch
General Elec. Co.
Shell Oil Co.
The Texas Co.

Panel Boards
General Elec. Co.
Mongerson's Elec'l Mach. Works
Square D Co.
Superior Switchboard & Devices Co
Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Electrical West, published monthly at San Francisco, Calif., October 1, 1938.

State of California, } ss.
County of San Francisco }

Before me, a notary in and for the state and county aforesaid, personally appeared George C. Tenney, who having been duly sworn according to law, deposes and says that he is the Editor of Electrical West, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher, McGraw-Hill Company of California.....
.....883 Mission St., San Francisco, Calif.
Editor, George C. Tenney.....883 Mission St., San Francisco, Calif.
Managing Editor .....None
Business Manager .....None
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2. That the owners are: Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amounts of bonds, mortgages, or other securities are: None.

GEORGE C. TENNEY, Editor.

Sworn to and subscribed before me this 23rd day of September, 1938.
(SEAL) W. E. SCHORD,
(My commission expires March 22, 1942)

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Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

AGAIN this month the principal electric sales promotion will feature lamps—first, Mazda lamps; second, the right size and type lamp for each particular job.

P. G. and E. will run one advertisement during the week of October 24. The same week, a large manufacturer will run thousand-line advertisements in key cities throughout P. G. and E. territory. And all during the month P. G. and E. will be advertising on outdoor posterboards, truck signs and colorful stickers attached to company bills.

If you sell lamps it certainly behooves you to advertise "light conditioning" the same as we do, and at the same time. It's that kind of advertising that pays best!

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 110-1038

Harvest Forecast

An unprecedented crop of profitable business for those in the electrical industry who will harvest it.

★

Never before has the general public been in a mood to listen as attentively to our story of wiring adequacy. This public interest has increased tremendously with the floods of national and local publicity released within the last few months. The national program has just started, and we can expect constantly increasing interest on the part of the public as the program continues.

But no amount of national or local advertising or publicity can do the entire job. It can attract attention so that a person building or remodeling wants good wiring, but at that point the local interests must take up the job and close the sale.

This is the job of the individual electrical contractor, the utility, the manufacturer, and the dealer, because every one of them benefits from the properly wired building.

Whatever branch of the industry your business represents, it benefits from adequate wiring installations, so follow through the national and local promotional work by calling the attention of your local public to the story of better wiring.

No matter how abundant may be this crop of business, it must be harvested. Today the electrical industry is presented with a bumper crop, but it won't harvest itself. Are you going to get your share of this harvest?

Pacific Coast Electrical Bureau

601 West 5th St., Los Angeles ● **447 Sutter St., San Francisco**